

San Joaquin County

**SLOW DISASTER
CASE STUDY**



**ENVIRONMENTAL
INJUSTICE**

Summer 2021

GROUP NO. 3

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ABOUT

This case study report was developed by students at the University of California Irvine for the undergraduate class, “Environmental Injustice,” taught by Kim Fortun and Kaitlyn Rabach for the Department of Anthropology, Summer 2021. The University of California Irvine is on the ancestral homelands of the Tongva and Acjachemen nations.

COVER PHOTO

The image is of the Tracy Combined-Cycle Power Plant located in San Joaquin County, which is one of the polluting facilities in San Joaquin County
Source: <https://ww2.energy.ca.gov/sitingcases/tracyexpansion/index.html> (Screenshot by Khue)

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TABLE OF CONTENTS

| | |
|--|----|
| INTRODUCTION | 6 |
| 1. COMMUNITY ASSETS & SETTING | 10 |
| 2. SLOW DISASTER & OTHER ENVIRONMENTAL THREATS | 21 |
| 3. COMPOUND VULNERABILITIES | 30 |
| 4. STAKEHOLDER ANALYSIS | 36 |
| 5. STAKEHOLDER ACTIONS | 39 |
| 6. ROLE OF MEDIA AND BIG ENVIRONMENTAL ORGANIZATIONS | 41 |
| 7. RECOMMENDED LOCAL ACTIONS | 43 |
| 8. RECOMMENDED EXTRA-LOCAL ACTIONS | 46 |
| 9. RECOMMENDATIONS FOR FUTURE RESEARCH | 49 |
| 10. INJUSTICE ANALYSIS | 54 |
| BIBLIOGRAPHY | 60 |
| FIGURES | 68 |

INTRODUCTION

This case study report focuses on routine, everyday air and water pollution in San Joaquin County.

We describe routine pollution as “slow disaster” because the impacts are drawn out and cumulative, causing harm slowly, increasing rates of asthma, cancer and heart disease. In many ways, slow pollution disasters are more difficult to deal with than fast, explosive disasters because people don’t pay attention to them or even think they are normal – especially in communities of color. Often, communities have to organize and fight to get their concerns about pollution heard and addressed by government officials. Often, particular people play important leadership roles. Sometimes, these people are residents impacted by a polluting facility. Sometimes, leading figures in fights for environmental justice are professionals – physicians who work in the community or engineers who work inside the polluting facilities. This case study describes many different stakeholders in routine pollution and the actions they have taken -- and not taken -- to improve environmental conditions.

The report addresses a series of ten questions (Fig. 2) that draw out local details in a manner that encourages comparison with other places. The research has been done quickly (within the constraints of a quarter-long undergraduate class) so is limited to and points to the need for further research and community engagement. The goal is to help build both a body of research on environmental injustice and a network of researchers ready to help conceptualize and implement next-generation environmental protections.

ENVIRONMENTAL INJUSTICE CASE STUDY FRAMEWORK

1. What is the setting of this case? What are its assets?
2. What environmental health threats (from explosions, everyday pollution, climate change, etc) are there in this setting?
3. What intersecting factors -- social, cultural, political, technological, ecological -- contribute to environmental health vulnerability and injustice in this setting?
4. Who are stakeholders, what are their characteristics, and what are their perceptions of the problems?
5. What have different stakeholder groups done (or not done) in response to the problems in this case?
6. How have environmental problems in this setting been reported by media, environmental groups, companies and government agencies?
7. What local actions would reduce environmental vulnerability and injustice in this setting?
8. What extra-local actions (at state, national or international levels) would reduce environmental vulnerability and injustice in this setting and similar settings?
9. What kinds of data and research would be useful in efforts to characterize and address environmental threats in this setting and similar settings?
10. What intersecting injustices -- data, economic, epistemic, gender, health, infrastructure, intergenerational, media, procedural, racial, reproductive -- contribute to environmental injustice in this setting?

FIGURE 1: This is the analytic framework that guided research for this case study.

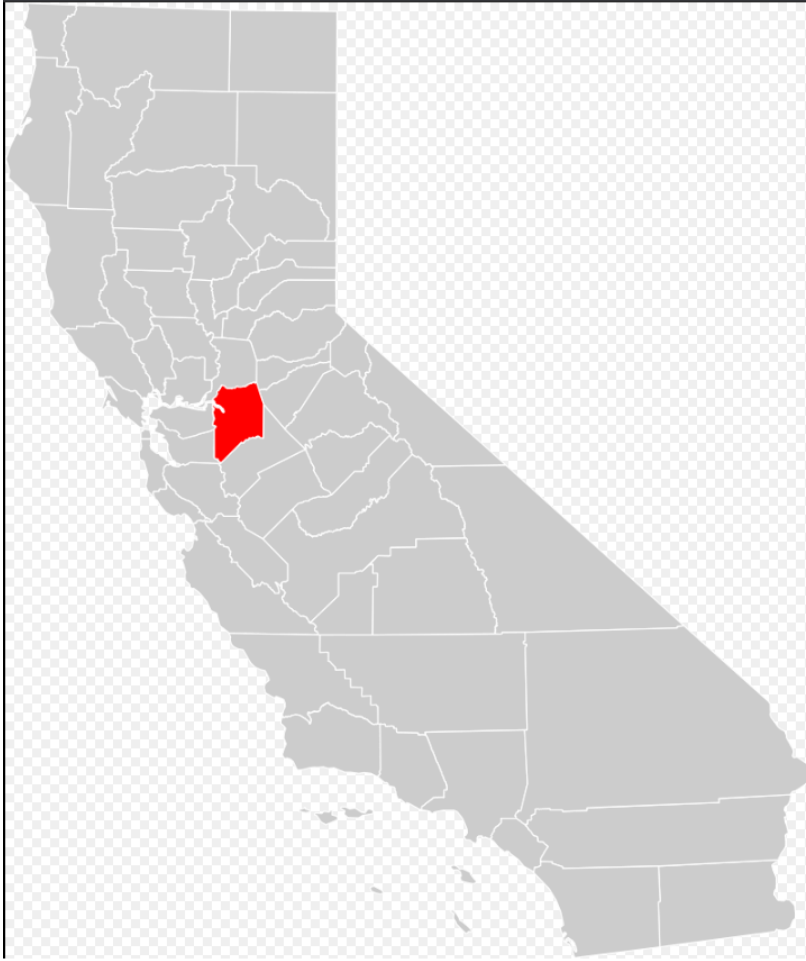


FIGURE 2: This case study takes place in San Joaquin County, which is a mainly agricultural county in Central California, with nearly 920,000 acres of land area, making it the 7th largest producer of Agriculture (San Joaquin Council of Governments, n.d.). Economically, the County is reliant on Agriculture and Manufacturing. The network of rivers that runs through the County supports both Agriculture and Manufacturing. San Joaquin Valley contributes 7.1% of California's Total Direct Economic Output. https://en.wikipedia.org/wiki/San_Joaquin_County,_California#Economy Screenshot by Raymond Tu 6/29/2021

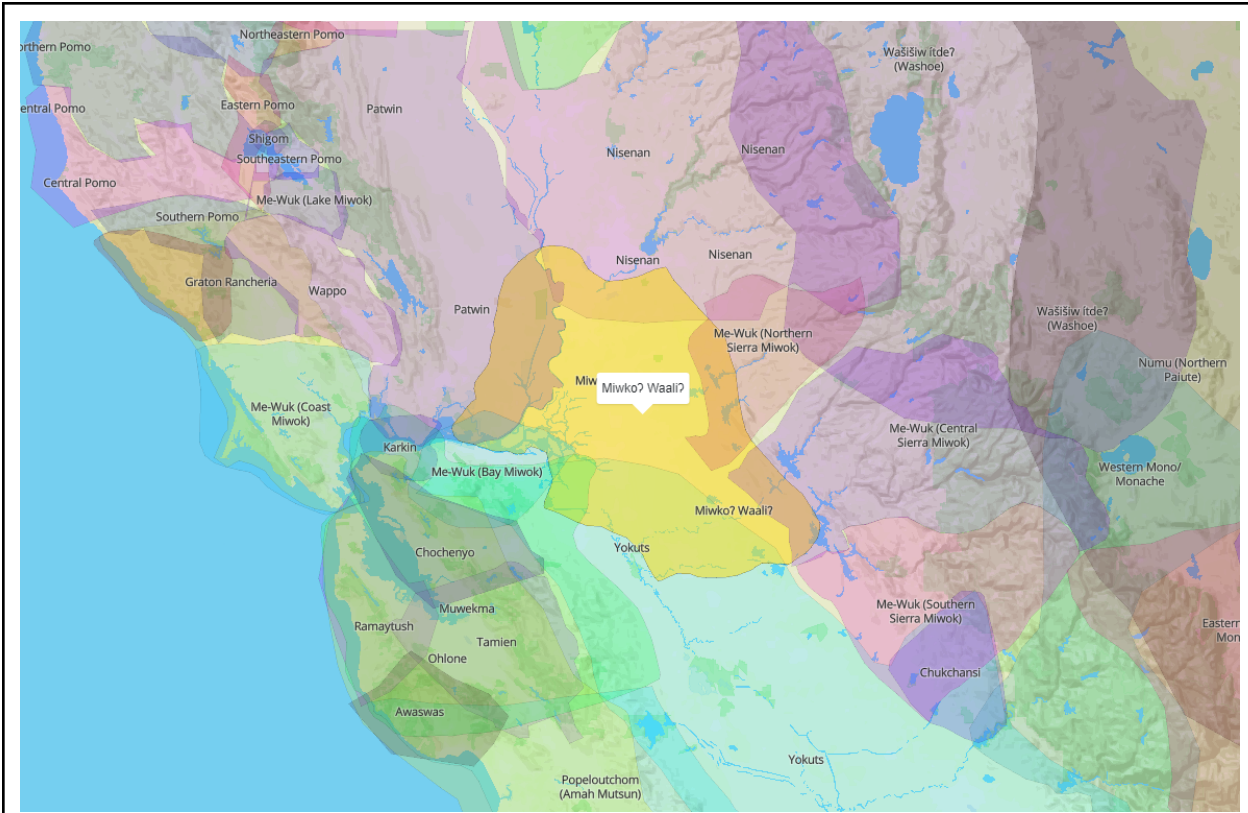


FIGURE 3: Native Lands' digital maps shows San Joaquin's City of Stockton on Miwok, Yokuts, Waali homelands. The Yokuts tribe established its first reservation in Lemoore, California in 1934. It was called the Santa Rosa Rancheria. Those residing on the reservation were below the poverty line and lived in huts, tin houses, old cars, and chicken coops. The average education level of the tribe was 3rd grade. The tribe was officially recognized by Congress in 1988 with the passing of the Indian Gaming Regulatory act. This brought about a greater access to improved education and housing. <https://native-land.ca/> (Screenshot by Raymond Tu 6/29/2021)

1. COMMUNITY ASSETS & SETTING

An Introduction to San Joaquin

This case study takes place in San Joaquin County, which is a mainly agricultural county in Central California, with nearly 920,000 acres of land area, making it the 7th largest producer of Agriculture (San Joaquin Council of Governments, n.d.). Economically, the County is reliant on Agriculture and Manufacturing. The network of rivers that runs through the County supports both Agriculture and Manufacturing.

San Joaquin Valley contributes 7.1% of California's Total Direct Economic Output. It generates more than 5 billion dollars in economic contribution and supports more than 33,000 jobs, which represents 9.0 percent of all County employment or about one out of every eleven jobs (Pelican, Tim, and Kamal Bagri, 2020). According to the 2017 Census of Agriculture, San Joaquin County has 3,430 farms, a total of 772,762 acres. Estimated market value of land and buildings average per farm is \$3,384,002, and average per acre is \$15,020.

This is in contrast to San Joaquin County's relatively low average income. Currently, a San Joaquin resident's average earned income is \$22,645 (per capita), \$7,673 less than California's average. San Joaquin's median household income is \$53,274, behind the state's median income, \$61,818 (San Joaquin Council of Governments, n.d.). Historically it has been comparable to the U.S.'s median income, only being above or below by a couple thousand dollars. This implies that there is a significant wealth divide between the

wealthiest and average resident in San Joaquin County, since the 5 billion dollars in economic contribution is not contributing to the economic prosperity of its average residents. The statistics indicate this too: 8,003 workers in San Joaquin County worked more than 150 days. 12,097 of the workers were migrant workers, and 2,652 of them were unpaid (USDA Census).

Viewed from an ethnic perspective, the majority of farms have a white producer, while minority producers only make up a fraction of the farms. In 2017, the number of all farms with a White producer was 3,241 and the number of White producers was 5,771. The number of all farms with a Hispanic, Latino, or Spanish producer was 447 and the number of Hispanic, Latino, or Spanish producers was 616. The number of all farms with an American Indian or Alaska Native producer was 27 and the number of American Indian or Alaska Native producers was 28. The number of all farms with an Asian producer was 173 and the number of American Indian or Alaska Native producers was 268. The number of all farms with a Black or African American producer was 18 and the number of Black or African American producers was 20. The number of all farms with a Native Hawaiian or Other Pacific Islander producer was 29 and the number of Native Hawaiian or Other Pacific Islander producers was 33. The number of all farms with a producer reporting more than one race was 45 and the number of producers reporting more than one race was 56 (USDA Census).

The county is quite dry, with an average annual amount of rain ranging from 8 inches to 18 inches. The temperature of the county “ranges from average daily maximums of 94 degrees to average daily minimums of 59 degrees in June and from average daily maximums of 53 degrees to average daily minimums of 36 degrees in January” (“Overview” 2017, 7).

The San Joaquin County has surrounding cities like Escalon, Lockeford, and Morada. Communities located in the center of the county like Stockton, August, and French Camp have a lower index Health Score. Low qualities of health are dispersed throughout the county. Tracy is the only exception with a high Healthy Places Index score (The California

Healthy Places Index). The county has an estimated population of 762,148, with the highest density of people living in the major cities: Stockton, Tracy, Manteca, Lodi, Escalon, Ripon and Lathrop. The plurality of the population are Hispanic or Latino at 42.0%, followed by Caucasian at 30.5%, and Asian at 17.4% (U.S. Census Bureau 2020).

There are also many community assets in San Joaquin County, including environmental organizations, local news organizations, libraries, and parks.

For environmental organizations, an example is the Environmental Justice Project Stockton. Established in 2005 through the Catholic Charities and the Diocese of Stockton, this organization challenges environmental issues of Air Quality and global warming issues through a religious voice. With an emphasis on community engagement, the focus is to provide county residents proper information to combat these disparities (Environmental Justice Project). With the limitations of the COVID-19 pandemic, folks have been limited and unable to attend physical meetings. This affects the ability to physically mobilize and take proper actions because of physical distancing. The majority of organizing is done online, which can pose problems in effectively mobilizing (Environmental Justice Project).

For community air monitoring networks, there is the San Joaquin County Air Pollution Control District. The district operates and maintains air quality control areas throughout eight different counties in San Joaquin County. Part of the analysis involves PM10, PM2.5, Nitrogen Oxides, and Ozone.

For local news organizations, there is CBS Sacramento. CBS Sacramento is a news organization providing local and community news throughout Northern California/the Bay Area. Residents of the San Joaquin County are able to receive all types of news relating to politics, entertainment, and weather. This news organization is community-oriented, where stories about residents or local information is constantly presented. This asset has been affected by COVID mostly because news regarding the pandemic is at the forefront of information. With the news station being entirely

dedicated to the local community, much of the attention is towards bringing credible and reliable information too. The challenge is making sure this information is readily accessible and true to members in San Joaquin County (CBS Sacramento, n.d.).

For legal aid, there is the California Rural Legal Assistance in Stockton. CRLA (California Rural Legal Assistance) provides legal assistance programs of education, employment and labor, rural health, and housing/landlord issues to folks in San Joaquin County. The assistance program aims to protect LGBTQ+, Mexican Indigenous, and farmworker communities. With this program utilizing an assistance-first basis, the center is only responsive towards non-urgent concerns because of the COVID-19 pandemic. This limits the ability for folks of the county and members of these communities to fully get proper resources. Workers at the assistance program can only direct folks on how to use proper resources through phone and email, rather than doing physical outreach (CRLA).

For an example of a proactive elected official, there is Dr. Troy Brown. As of July 4th, 2021, Dr. Troy Brown swears in as the 27th Superintendent for schools of the San Joaquin County. His focus is to deliver educational opportunities to the 150,000 students county-wide. "Brown also intends to focus on strengthening career technical education, providing STEM (science, technology, engineering, and mathematics) programs to educate students and train teachers, and making professional development and other resources available to school districts as they accelerate learning and increase social and emotional supports as they recover from the impacts of the pandemic" (Recordnet).

For libraries, there is the Stockton-San Joaquin County Public Library. The local library is an open resource where folks can have access to open research databases and can participate in community events. Because this source is open to the public, folks have information to any type of item related to local events and environmental news (Stockton-San Joaquin County Public Library, 2021). Because COVID has placed limitations in accessing potential areas due to Social Distancing, areas like the library are off limits. This means that folks can't have regular daily access to certain educational or online resources especially if they don't have their own methods to technology

(Stockton-San Joaquin County Public Library, 2021).

For parks, there is the Micke Grove National Park. With this park having tons of green areas and an open lake, this is a meeting place for all-types of recreational activities. Such areas include the Micke Grove Zoo, a Fun Town at Micke Grove (Amusement Parks), and the San Joaquin Historical Museum. The park is unable to hold many events due to Social Distancing laws of COVID-19. Folks can still attend the park but must be mindful of the COVID restrictions at place. Additionally, with certain events being cancelled because of the pandemic, community involvement and organizational events limit the possibility for engagement (San Joaquin County Parks & Recreation, n.d.).

For schools, there is the Banta Elementary School District and the Escalon Unified School District. Banta Elementary is one of the oldest school districts founded in San Joaquin County. It's located throughout the rural and industrial areas of the Tracy city limits. Low-income students are provided with technology hotspots, bilingual services, and many other amenities for their education. Given the limitations of COVID-19, Banta Elementary was prepared for school shut down before the mandatory COVID lockdown restrictions. Low-income students have access to bilingual services through phone and Zoom calls, but their accessibility to working technology is limited which impacts their own learning from home environments (Banta Elementary School District). Escalon Unified School District was officially established on July 1st, 1967. With a focus on making their students socially-responsive to any type of issue, their focus is to center academics, collaboration, and leadership. Escalon Unified School District is made of four elementary schools (Collegeville Dual Language Immersion, Dent Farmington, and Van Allen), one middle school (El Portal), one comprehensive high school (Escalon High), one continuation school (Vista), and one charter school (Escalon Charter Academy/Gateway Home School).

For community colleges, there is the San Joaquin Delta College. Located in San Joaquin Valley, San Joaquin Delta College is dedicated to providing its students quality education in hopes of transferring them to University of California and California State systems. With tracks dedicated to the Health Sciences, Agriculture, and the Social Sciences, the

quality of education will prepare them for their Bachelors.

For sports clubs and facilities, there is the Regional Sports Complex. This openly public sports complex is open to community members of the San Joaquin County offering a four-field softball complex, four soccer fields, concession stands, and a picnic shelter.

For churches that support inclusive prosperity, there is the Episcopal church. Diverting away from the traditional gospels and teachings, this church aims to spread the Word of God through intersectional topics of race, gender, and sexuality. Their aim is to teach with the intention of challenging acts of racism and anti-LGBTQ+ ideas (Episcopal Church).

For affordable community healthcare, there is the Health Plan of San Joaquin. Health Plan of San Joaquin (HPSJ) has been serving the valley and county residents enrolled in publicly-funded programs. It's a sponsored non-profit Health Maintenance Program which aids members in managing Medical. Aside from the many health resources it provides, HPSJ also provides resources to aid from racial trauma, housing crises, and familial problems (Health Plan of San Joaquin).



FIGURE 4: This is a freeway and agricultural overview of San Joaquin County. As the county is intertwined with city and agricultural life, main forms of air pollution come from these sources affecting the health wellbeing of residents of the county.

Source: Commons Wikimedia

https://commons.wikimedia.org/wiki/File:San_Joaquin_River_Viaduct_aerial_2019.jpg

Screenshot by Joseph William Garcia 06/29/2021



FIGURE 5: This is an image overlooking Bakersfield, California that has been clouded with smog. It depicts the issue of air pollution that remains prominent in the San Joaquin Valley.

Source:

<https://www.universityofcalifornia.edu/news/ten-percent-san-joaquin-valleys-ozone-pollution-comes-outside-california>

(Screen Shot by May Weng)

2017 CENSUS OF AGRICULTURE County Profile



San Joaquin County California

Total and Per Farm Overview, 2017 and change since 2012

| | 2017 | % change since 2012 |
|------------------------------|---------|---------------------|
| Number of farms | 3,430 | -4 |
| Land in farms (acres) | 772,762 | -2 |
| Average size of farm (acres) | 225 | +2 |

5 Percent of state agriculture sales

Share of Sales by Type (%)

| | |
|----------------------------------|----|
| Crops | 75 |
| Livestock, poultry, and products | 25 |

FIGURE 6: This figure was drawn from the US Department of Agriculture profile for San Joaquin County, California. It shows the decrease in the percent change in number of farms and land in farms since 2012, and the percent increase in the average size of farms.

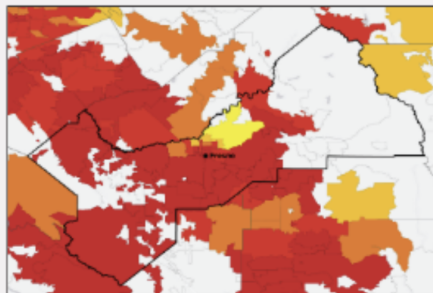
Source:

https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/California/

(Screenshot by May Weng)

Campaign Goal

Communities in Fresno County by Need Level



The Index uses ZIP Code-level data to identify California communities most in need of immediate and long-term pandemic and economic relief. It is comprised of three components—Risk of Infection, Severity of Illness, and Recovery Need—with the last scoring a community's ability to recover from the pandemic's health and socioeconomic costs.

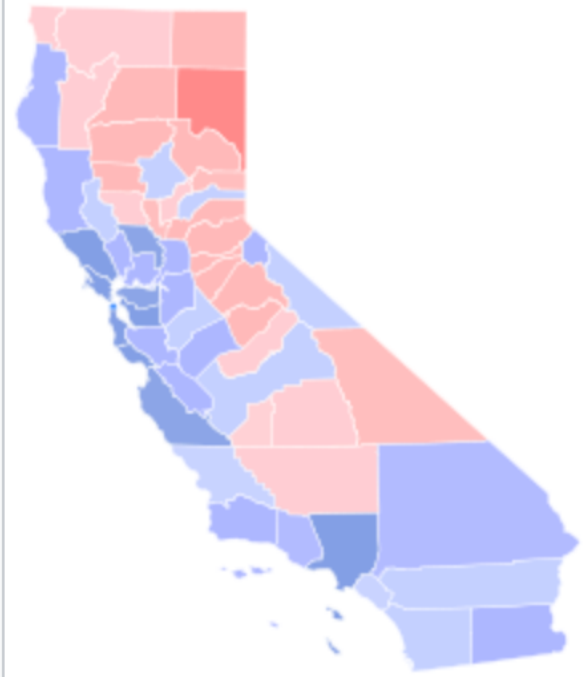
VULNERABILITY & RECOVERY INDEX CATEGORY

| |
|-------------------------------|
| LOWEST (10-19th Percentile) |
| LOW (20-39th Percentile) |
| MODERATE (40-59th Percentile) |
| HIGH (60-79th Percentile) |
| HIGHEST (80-100th Percentile) |



FIGURE 7: TheRace Counts data identifies California communities most in need of immediate and long-term pandemic and economic relief.

Source: <https://www.racecounts.org/county-reports/> (Screenshot by May Weng)



Party registration by county
(October 2018):

- Democrat \geq 30%
- Democrat \geq 40%
- Democrat \geq 50%
- Republican \geq 30%
- Republican \geq 40%

FIGURE 8: This Wikipedia map shows that San Joaquin County has a significant Democratic majority. Given the pro-regulatory stance of most Democrats, this suggests that it may not be difficult to create and enforce regulatory policies that help reduce environmental hazards. This means it might be significantly easier to pass policy compared to more republican counties.

Source: https://en.wikipedia.org/wiki/California_locations_by_voter_registration

Screenshot by Raymond Tu 6/29/2021

Choose a category:

Voter ID laws

Voter registration laws

Felony disenfranchisement

Early voting

The stricter the laws on acceptable forms of personal identification, the more difficult it is for minority groups to cast a ballot.

Identification requirements for voting in the US

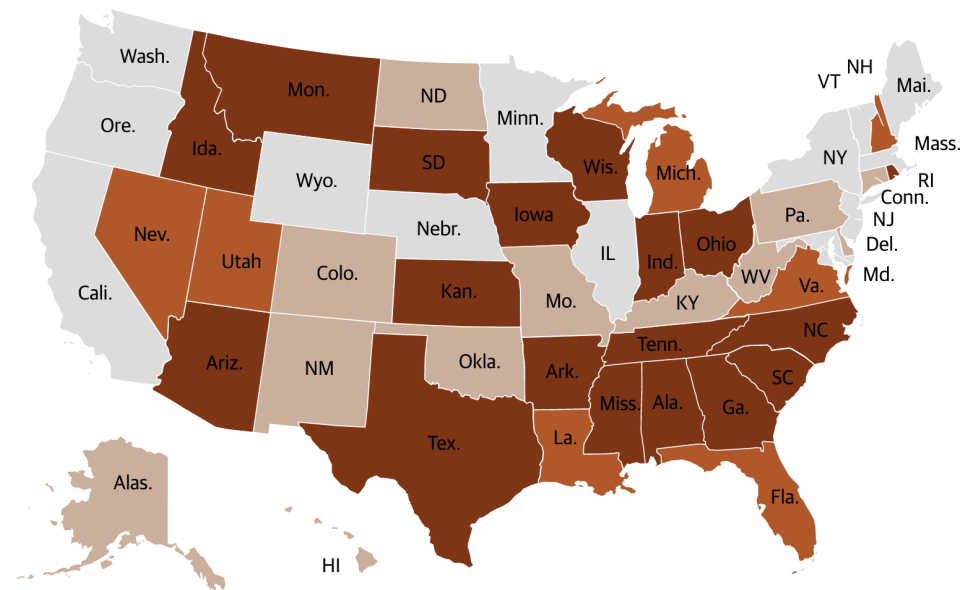
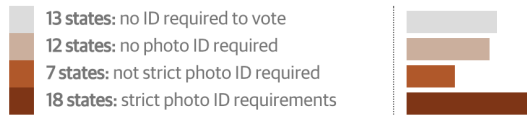


FIGURE 9: The state of California has laws that make it easier to vote than in many other US states. This strengthens democratic capacity across the state of California. In San Joaquin County, residents have the option to vote by mail, in person at the registration office and the voter service center, and have full accessibility of their mail in ballots. The county proposes flexibility and a multitude of ways to vote.

Source:

<https://www.theguardian.com/us-news/ng-interactive/2019/nov/07/which-us-states-hardest-vote-suppression-election> (Screenshot by Joseph William Garcia 07/06/2021)

2. SLOW DISASTER & OTHER ENVIRONMENTAL THREATS

Daily Life with Death

Khue Tran

San Joaquin is infamous for its level of pollution and the amount of toxic waste. Having agriculture as the main industry, facilities in San Joaquin use a lot of water, soil, fertilizers, pesticides, and cattle and poultries. Without strict regulations and proper management, toxic waste and pollution are mixed in the air and water, threatening residents' health as well as their quality of living conditions.

Water contamination in San Joaquin is in a severe situation. High levels of nitrate from synthetic fertilizers are found in groundwater and soil. During an investigation in 2007, reports showed that 75% of the nitrates exceedances originates in San Joaquin Valley. Researchers estimate that by the year 2020, the number of wells with nitrate levels above the maximum contaminant levels (MCL) will double (Moore 2011, 7). Nitrate is labelled as a carcinogen, and the toxic can be fatal to infants. Exposure to nitrate can lead to defects in respiratory and reproductive system, impact spleen and kidney functions, and cause various kinds of cancer. While water contamination affects everyone, small communities

with low-income and high Latinx populations are hit the hardest. Anne Weir Schechinger, Senior Analyst of Economics, wrote in her article: “Between 2003 and 2017, 199 majority-Latino systems, serving almost 2.3 million people, tested at or above 3 mg/L. Ninety-one percent of these systems rely on groundwater as their source of drinking water. 157 systems serving 2.2 million people tested at or above 5 mg/L. 69 systems serving close to 1.5 million people tested at or above 10 mg/L” (Schechinger 2020). For a detailed breakdown, here is the table taken from California State Water Resource Control Board and 2018 American Community Survey in EWG’s report:

| System Name | 2003-2017 Nitrate Average in mg/L | Percent Latinos in Census Block Group |
|---|-----------------------------------|---------------------------------------|
| Rodriguez Labor Camp | 27.3 | 81.8% |
| Tony Morris/Morris Dairy | 23.5 | 58.8% |
| Sierra Mutual Water Company | 21.5 | 36.0% |
| Souls Mutual Water Company | 16.7 | 73.3% |
| Beverly Grand Mutual Water | 16.7 | 78.2% |
| East Wilson Road Water Company | 13.1 | 79.4% |
| Lemon Cove Water Company | 12.8 | 18.6% |
| Sierra Vista Association | 12.7 | 60.1% |
| Wilson Road Water Community | 12.6 | 73.6% |
| San Joaquin Estates Mutual Water Company | 12.2 | 41.5% |
| Del Oro River Island Service Territory #2 | 11.7 | 50.3% |
| Faith Home Teen Ranch | 10.5 | 25.0% |
| El Monte Village Mobile Home Park | 10.4 | 20.7% |
| Plainview Mutual Water Company, Central Water | 10.2 | 81.8% |
| Son Shines Properties | 9.9 | 32.1% |
| Hillview Water Company, Raymond | 9.6 | 16.3% |
| Lake Success Mobile Lodge | 9.6 | 50.3% |
| Triple R Mutual Water Company | 9.5 | 13.2% |
| R.S. Mutual Water Company | 9.4 | 2.7% |
| East Orosi Community Services District | 9.3 | 80.3% |

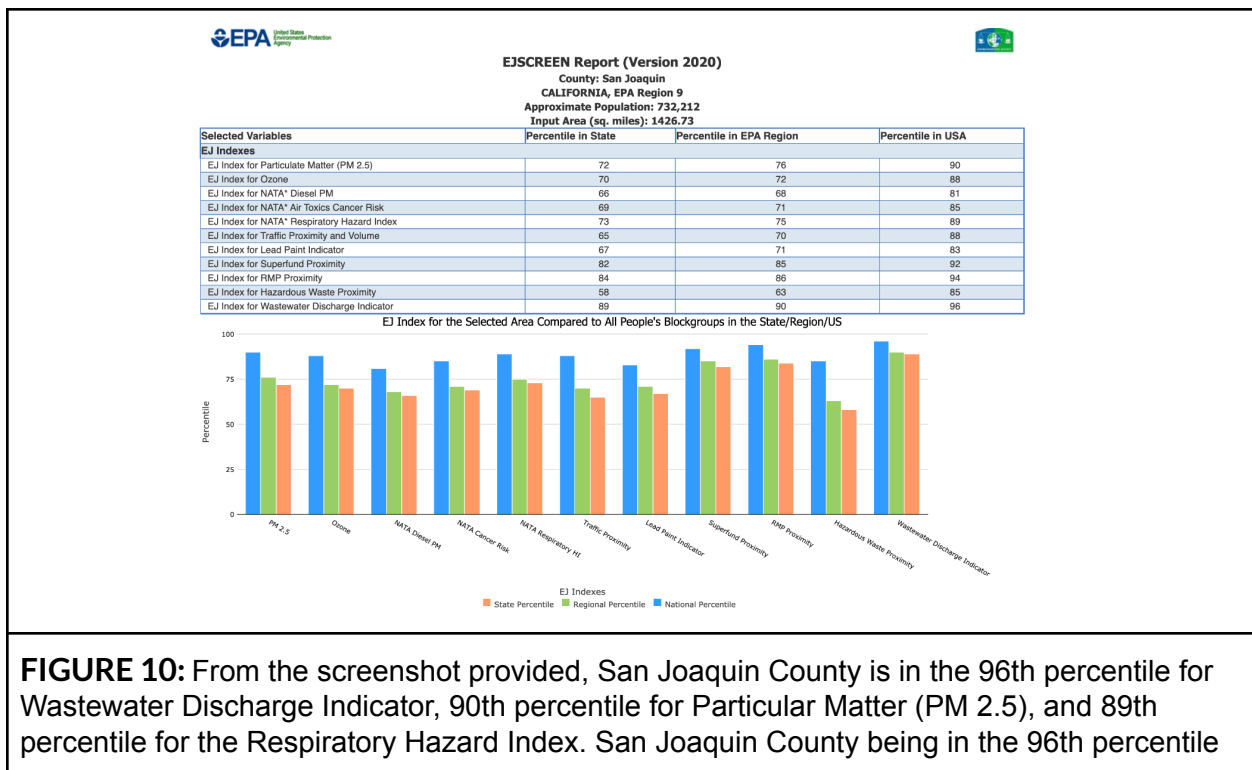
Figure 9.5: San Joaquin Valley Community Water Systems With the Worst Nitrate Contamination

According to the chart, in the top 5 systems with a high average of nitrate, 4 of them also have more than 50% of Latino population in the communities. Within 20 water systems, 7 of them have more than 70% of Latino population in the communities.

Air pollution is also another major problem in San Joaquin County. Based on an assessment of San Joaquin community health, 39.0% of Community Survey respondents report that air pollution is a major environmental concern in their community; 27.7% of Community Survey respondents report that breathing problems are a top health concern in their community; 28.6% of Community Survey respondents report that cigarette smoke is a major environmental concern in their community; The percentage of days exceeding PM2.5 standards is high throughout the county, with the most affected areas in the northern and central part of the county. Among them, Lodi and Stockton exhibited the highest percentages of days with levels above PM2.5 standards (“Asthma/Air Quality”). Air pollution can come from anywhere: traffic, smoking, methane from cattle, and other gas from agricultural facilities. As a result, San Joaquin has high rates of asthma among adults and youths, being 20.8% and 34.3% respectively. Aside from asthma, through experiments, UC Berkeley/Stanford Children’s Environment Health Center concluded that the consequences of air pollution can have a wide range of health issues including adverse effects on numerous birth outcomes such as preterm birth and several birth defects, on the immune system throughout development and the promotion of allergic disease, and on metabolic dysregulation in children (“Final Report”).

The third major problem in San Joaquin County is concentrated animal feeding operations (CAFOs). Each CAFO can have thousands of cattle, and the amount of manure released can weigh up to tons. Animal manure can’t be dumped naturally and needs to be handled through a wet or dry system. Dry manure handling system is commonly used in poultry operations, and it releases a considerable amount of nitrous oxide into the air. Wet handling system not only pollutes the air with methane and hydrogen sulfide but also breeds insects and bacteria. Furthermore, it contaminates the water with nitrate and ammonia (Devine 2020). With all the gas emissions, CAFOs are the main contributor to the greenhouse effect. Another negative impact of CAFOs on the environment is deforestation for farming land, killing wildlife and their habitats. While possessing an extremely large farming area, most of them are used to feed livestock instead of growing

human food, which is inefficient and increases the number of people with malnutrition. Additionally, overusing lands can eventually kill the soil and all living creatures under it. High quantities of nutrients in water from industrial crop fertilizers and animal waste cause excessive aquatic plant growth – a process known as “eutrophication,” which, in turn, causes “hypoxia,” or water that is low in oxygen. Harmful algal blooms (HABs) occur when aquatic algae grow rapidly out of control. Some types of HABs produce biotoxins, which can kill fish and other aquatic life and cause human illnesses, while others use up the oxygen in the water producing “dead zones,” where aquatic creatures cannot live (FootPrint). Most importantly, excess uses of antibiotics and pesticides can have serious consequences: make the plants weaker and more vulnerable to pests and insects; raise the acidity of the soil, affecting its productivity; contaminate the water, affecting people’s health. The most harmful effect of antibiotics is creating “superbugs,” which is bacteria that grows resistant to the antibiotics. These bacteria can kill both animals and humans, and some of them, such as Salmonella, Campylobacter, Enterococci, and E. coli, are recorded by WHO to have been transmitted between animals and humans (MacMullan 2007).



for Wastewater Discharge is due to groundwater contamination and pollution.
Image source: https://ejscreen.epa.gov/mapper/ejscreen_SOE.aspx (Screenshot by Joseph William Garcia 07/06/2021)

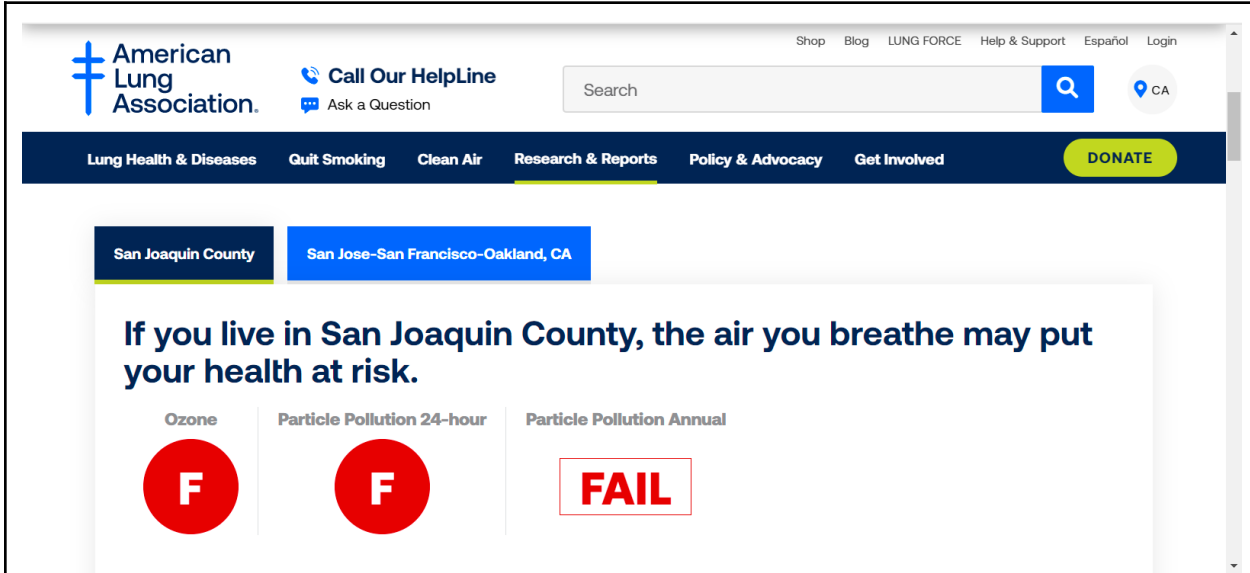


FIGURE 11: According to the figures, San Joaquin has major air pollution problems which puts people’s health at risk. The amount of particle matter and ozone doesn’t meet the regulation standard.
Image source: [San Joaquin | American Lung Association](#) (Screenshot by Khue Tran, 07/06/2021)

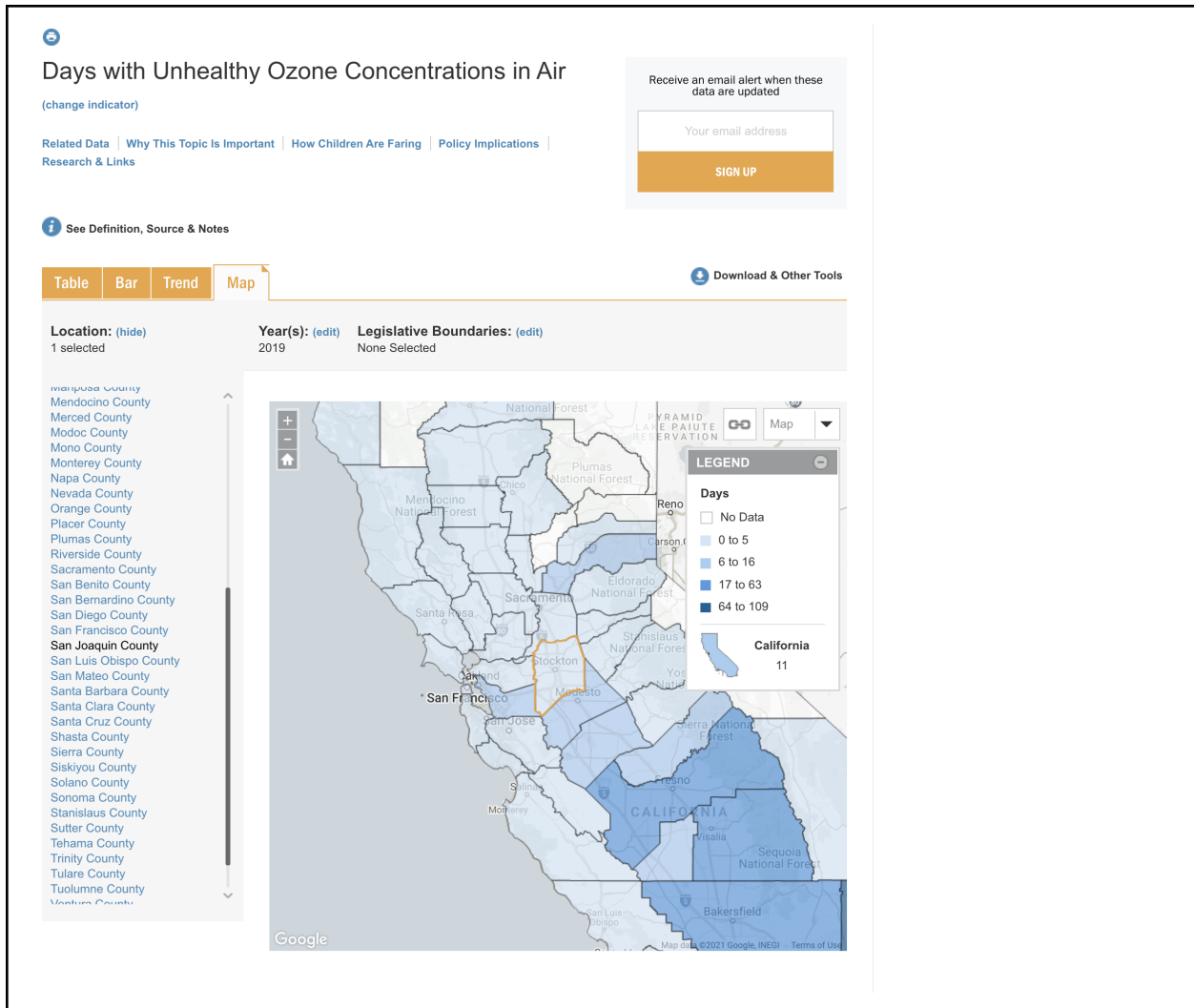


FIGURE 12: From the data of 2019, San Joaquin County has a total of 3 days that were above the regulatory standard for ozone. Children who are exposed will have some breathing problems due to their bodies still developing.

Image source:

<https://www.kidsdata.org/topic/525/air-ozone/map#loct=3&fmt=2750&loc=349&tf=124¢er=-13497913.124039.4564038.0301849&zoom=2> (Screenshot by Joseph William Garcia 07/07/2021)

Year(s): (edit) 2019
Sort: (edit) By Location

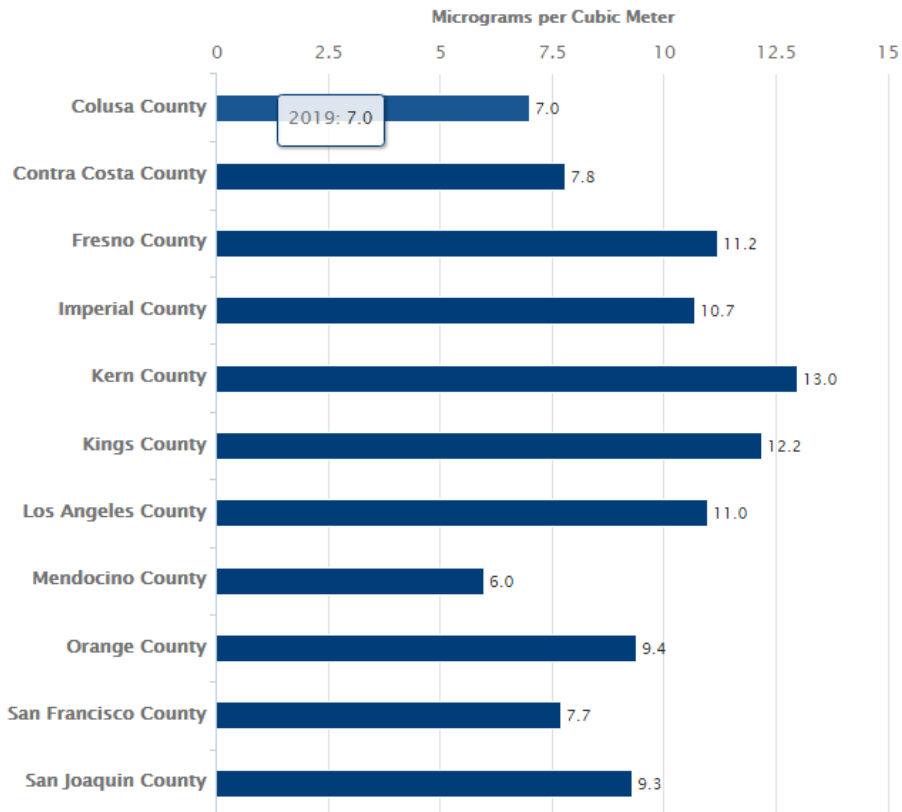


FIGURE 13: San Joaquin County seems to be in the middle of the pack in terms of California Counties for Average Particulate Matter Concentration in Air. This air pollution can lead to adverse birth outcomes, obesity, cardiovascular and respiratory diseases, and cancer. Image source: <https://www.kidsdata.org/topic/80/air-quality/summary> (Screenshot by Raymond Tu 7/6/2021)

Air Quality: Particulate Matter[†]

Air pollution is a leading environmental threat to human health. Particles in the air like dust, dirt, soot, and smoke are one kind of air pollution called particulate matter. Fine particulate matter, or PM_{2.5}, is so small that it cannot be seen in the air. Breathing in PM_{2.5} may

- lead to breathing problems,
- make asthma symptoms or some heart conditions worse, and
- lead to low birth weight.

The national standard for annual PM_{2.5} levels is **12.0µg/m³**. When PM_{2.5} levels are above 12, this means that air quality is more likely to affect your health.

In 2016, the annual level of PM_{2.5} in **San Joaquin County** was **14.1µg/m³**. *

* Micrograms per cubic meter (µg/m³)

ANNUAL AMBIENT CONCENTRATION OF PM_{2.5}

14.1 µg/m³*

San Joaquin County, California

12.0 µg/m³*

Annual National Standard

*Micrograms Per Cubic Meter (µg/m³)

FIGURE 14: San Joaquin County has a higher air pollution than the national standard (by about 20%). This can lead to breathing problems, asthma symptoms, or low birth weight in San Joaquin County.

Image source: <https://ephtracking.cdc.gov/showInfoByLocationExt?&FIPS=06077>
(Screenshot by Raymond Tu)

Proximity To Highways[†]

Traffic-related air pollution is a major cause of unhealthy air quality, especially in urban areas. Many health problems have been linked to exposure to traffic-related air pollution. The closer your home or school is to a major highway, the more likely you and your family are to be exposed to traffic-related air pollution.

In 2011, **5.3%** of the population of San Joaquin County lived within 150 meters* of a major highway.

In 2011, **2.2%** of San Joaquin County public schools (preK-4th grade) were sited within 150 meters* of a major highway.

* 150 meters is about 2 blocks.



5.3%



of San Joaquin County population that live within 150m of a highway

FIGURE 15: Residents in San Joaquin County are in close proximity to major highways. Folks who are nearest towards these highways have more complications associated with their health.

Image source: <https://ephtracking.cdc.gov/showInfoByLocationExt?&FIPS=22093>

(Screenshot by Joseph William Garcia 07/06/2021)

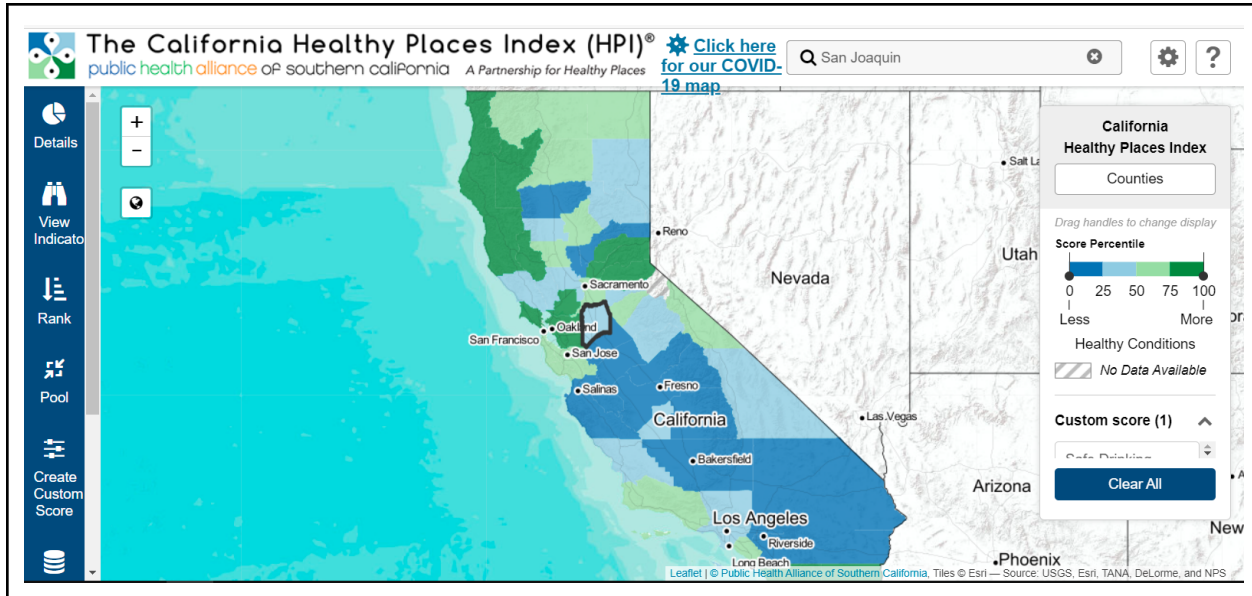


FIGURE 16: San Joaquin County has a lower index score combining information about 13 contaminants and 2 types of water quality violations that are sometimes found when drinking water samples are tested than **25%** of other California counties. Image source: [California Healthy Places Index Map](#) (Screenshot by Khue Tran, 07/06/2021).

3. COMPOUND VULNERABILITIES

The Multitude of Factors that Intensify Environmental Injustice

Ju Yeon Kim, Raymond Tu, Khue Tu Thy Tran

San Joaquin County is a significant agricultural and oil drilling site for the U.S. At first glance, the county looks exceptionally fertile, rich in resources; especially places like San Joaquin Valley full of fruits, nuts, and vegetables reinforce this impression. Yet, numerous sources unveil that the county's people are vulnerable to environmental hazards and various kinds of injustices.

San Joaquin County's residents suffer from low performance in social communities, economy, health, crime and justice, and education. Especially, this county has a high disparity in crime and justice, meaning racial discrimination is still a problem. With a high Latinx population, discrimination can lead to a stagnant economy growth and income inequality. Since Black and Latinx experiencing more discrimination than other races, their communities can lack access to fresh produce and quality facilities. Black and Latinx will experience more severe health problems as well as less treatment available due, resulting in a high mortality rate.

Being an agricultural and oil drilling site means the county is filled with contaminated water, gas emissions, chemical hazards, and more. In San Joaquin County, residents not only live in polluted environments but also live too close to high-risk industrial facilities. In fact, the county is closer in proximity to RMP facilities than 98% of the population in the US (EPA). This results in significant air and water pollution: with a water contamination index score of 606.62 in drinking water, 12.24 µg/m³ of fine particle matter concentration, and 13.1kg/day of particulate pollution from diesel.

However, residents remain vulnerable to the hazards due to economic reasons. The poverty rate of people living in the county is 30.6% (City Data). Household income as a whole is also lower than other counties; the median household income of San Joaquin County in 2019 is \$36,690, while California's median household income in 2019 is \$80,440. (City Data) Additionally, California Healthy Places Index Map represents that in San Joaquin County, 26.13% of low-income people pay more than 50% of their wages for housing. All these economic factors make it hard for people to relocate, despite the serious environmental hazards they are facing daily. Community members who are working at farms or oil refineries have no choice but to work there to support their families.

Economic hardships are often linked with educational levels since many jobs with higher wages require a minimum of bachelor's degree. According to the San Joaquin Council of Governments website, San Joaquin County ranks 46th out of 58 California counties with its 78% high school graduation rate. According to figure 18, only 18% of people have a bachelor's degree or higher at the age of 25+. Most of them only finish high school or attend college without getting any degree, and 22% of said population don't even receive a high school diploma. With low educational attainment, it is hard for them to improve their communities. They can only do several low wage jobs or highly dangerous one to make ends meet. It can deteriorate their physical and mental health, making them spend a lot of money for medicines, eventually creating a vicious cycle.

Also, historically disadvantaged populations take up a large percentage of the population in the county, especially Hispanic and Latinx groups. Since many of them are non-US citizens and undocumented, they cannot file complaints about their poor working conditions and low wage, not to mention longer working hours. Furthermore, many people are more likely to have linguistic barriers, resulting in low English performance.

There are also significant problems with childhood and parenting in San Joaquin County. While having a young population, which is having a high number of children under 18 in households, the child care system is significantly lacking. Poor quality and quantity of child care system may be a factor in high male suicide rate in youth, with 12 males over 1 female in 2017. When compared to California, San Joaquin also has a high infant mortality rate, high death rate in youth, high obesity rate, domestic violence, and child rate in foster care. With a high mortality rate in youths, San Joaquin's population may become old, meaning there will be less young adults and more seniors in near future. This will result in less workforce and a possible decrease in economic growth.

Compound vulnerabilities including poverty, low educational attainment, and race are closely related to each other. All these factors contribute to health disparities and disproportionate environmental injustices among San Joaquin County, excluding the community members from clean air, clean soil, and clean water.

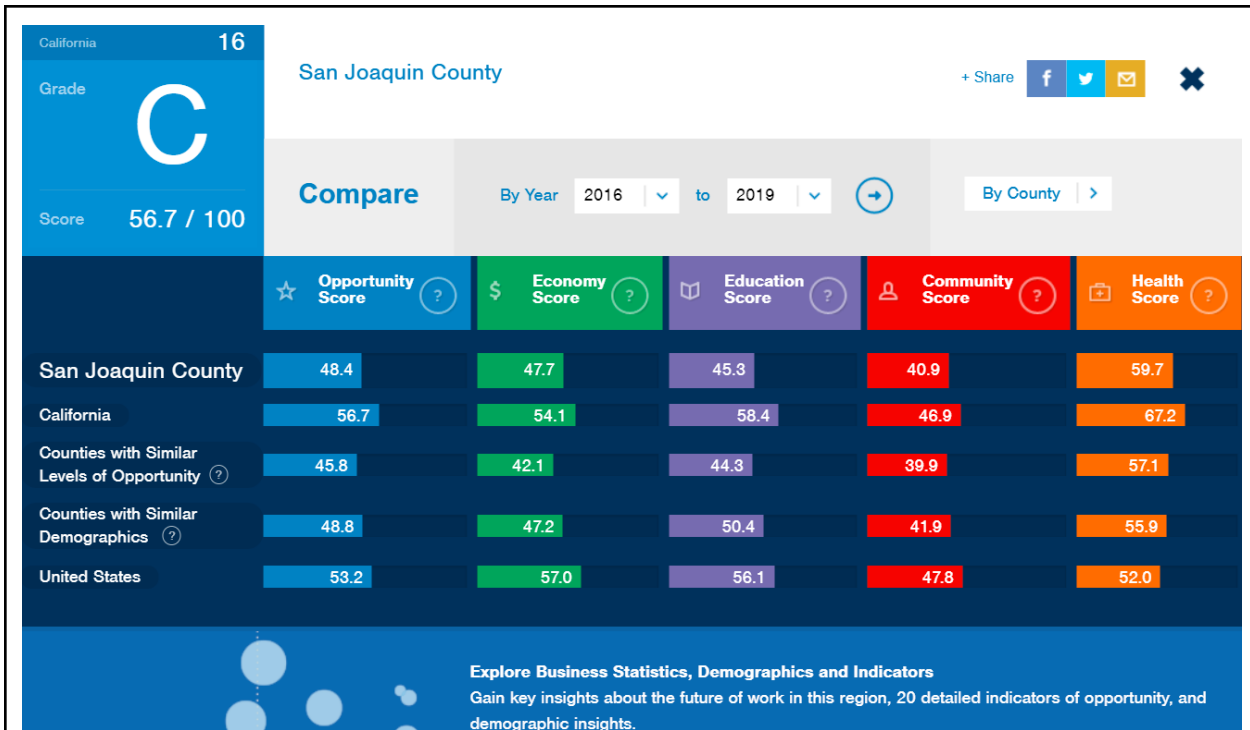


FIGURE 17: San Joaquin County’s score is lower than California’s or the US’s score. People in San Joaquin don’t receive a lot of opportunities, and the county’s development is below average.

Image source: [Opportunity Index - The Opportunity Index measures 16 key indicators to produce an overall opportunity score and grade for all 50 states, Washington DC & over 2,900 counties.](#) (Screenshot by Khue Tran, 07/06/ 2021).



EJSCREEN ACS Summary Report



Location: San Joaquin County
 Ring (buffer): 0-mile radius
 Description: Demo

| | 2014 - 2018 ACS Estimates | Percent | MOE (±) |
|--|------------------------------|---------|---------|
| Population 25+ by Educational Attainment | | | |
| Total | 458,237 | 100% | 153 |
| Less than 9th Grade | 51,380 | 11% | 1,643 |
| 9th - 12th Grade, No Diploma | 45,525 | 10% | 1,477 |
| High School Graduate | 129,211 | 28% | 2,369 |
| Some College, No Degree | 147,635 | 32% | 2,663 |
| Associate Degree | 42,744 | 9% | 1,355 |
| Bachelor's Degree or more | 84,486 | 18% | 1,980 |
| Population Age 5+ Years by Ability to Speak English | | | |
| Total | 679,489 | 100% | 0 |
| Speak only English | 401,180 | 59% | 3,489 |
| Non-English at Home ¹⁺²⁺³⁺⁴ | 278,309 | 41% | 3,898 |
| ¹ Speak English "very well" | 162,113 | 24% | 3,057 |
| ² Speak English "well" | 54,158 | 8% | 1,973 |
| ³ Speak English "not well" | 41,482 | 6% | 1,577 |
| ⁴ Speak English "not at all" | 20,556 | 3% | 1,114 |
| ³⁺⁴ Speak English "less than well" | 62,038 | 9% | 1,930 |
| ²⁺³⁺⁴ Speak English "less than very well" | 116,196 | 17% | 2,760 |
| Linguistically Isolated Households* | | | |
| Total | 18,921 | 100% | 857 |
| Speak Spanish | 12,132 | 64% | 669 |
| Speak Other Indo-European Languages | 1,821 | 10% | 337 |
| Speak Asian-Pacific Island Languages | 4,713 | 25% | 396 |
| Speak Other Languages | 255 | 1% | 131 |

FIGURE 18: San Joaquin county has a low educational level. The majority of people at the age of 25+ have no college degree. Most people are only high school graduates and college dropouts. 22% of the said population don't even finish high school.

Image source: [demogreportpdf.aspx \(epa.gov\)](https://demogreportpdf.aspx.epa.gov) (Screenshot by Khue Tran, 07/06/ 2021).

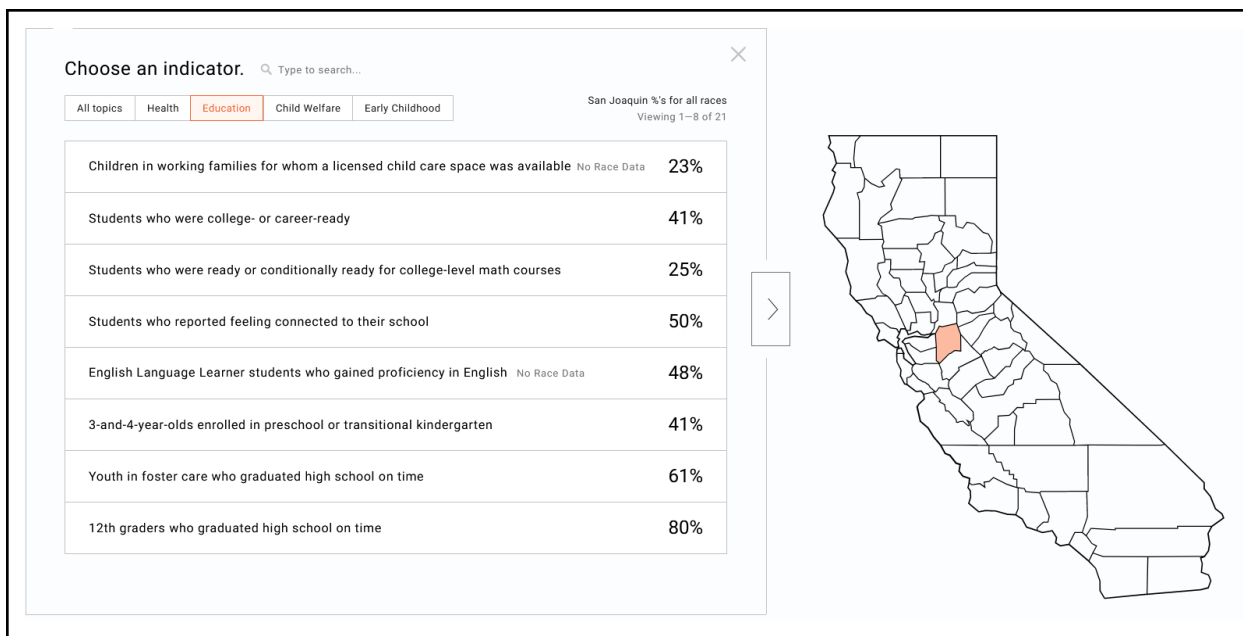


FIGURE 19: In San Joaquin, students are having trouble being college or career-ready since only 41% of them are college ready. Furthermore, only 48% of English Language Learner students have gained proficiency in English, which may make it difficult for residents to understand environmental reports and accurately assess the environmental threats.

Image source: <https://scorecard.childrennow.org/?cty=sanJoaquin&yr=3> (Screenshot by Raymond Tu 7/6/2021)

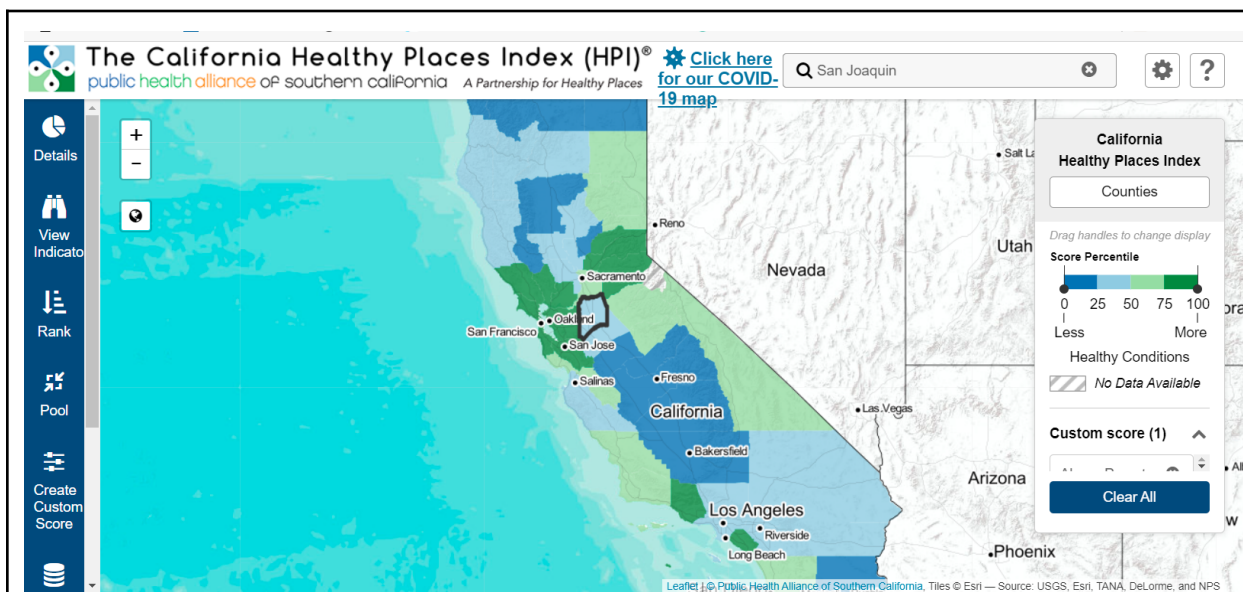


FIGURE 20: In San Joaquin county, only 57.78% of people have an income exceeding 200% of the federal poverty level. The poverty level is set at 200% due to high living costs in California.

Image source: [California Healthy Places Index Map](#) (Screenshot by Khue Tran, 07/06/2021).

4. STAKEHOLDER ANALYSIS

Perspectives in San Joaquin County

There are various stakeholders, such as Agricultural Companies or poor farm workers, in San Joaquin County, of which many have contrasting views and motives regarding slow disasters and environmental impact.

Poor farm workers want better working conditions, so that they do not get sick, and want higher wages, since the average median income is significantly below California's median. They are influenced by their knowledge about working conditions and poor wages, and are impeded by their lack of money, political power, and their lack of organization (Carroll Rory, May 13, 2016).

Large Agricultural Corps want to keep the current status quo, low wages for workers and generate a lot of revenue without having to care about environmental impact. They are motivated by their immense revenue, economic importance, substantial political power, and the lack of significant environmental protection restrictions. They are undermined by stronger Environmental Protection Laws, global warming and droughts, and new findings about the health risk of chemicals.

Crop and Meat Consumers want good quality and cheap agricultural products, and also limited negative effects on their health due to chemical use. They are motivated by their awareness about the harmful effects of chemicals and the cheap prices of crops. They

suffer from the lack of proper organization, lack of money and political power, and the lack of concrete data proving the negative effects of chemicals.

Environmental Activist Groups, such as the Environmental Justice Project (Stockton) want less pollution and less negative impacts on the health of workers, local residents, and consumers. They are motivated by their organization, care towards residents, substantial research about the harmful effects of chemicals, honorable reputation, and somewhat significant political influence. They are undermined by their relative lack of money compared to large Agriculture and Manufacturing companies, collective action problems such as free riding, and lack of concrete data proving the negative effects of chemicals.

Pollutant Monitoring Groups, such as the California State Water Board and the San Joaquin Valley Air Pollution Control District, want to keep the pollution levels at an acceptable level while still having economic prosperity. They are motivated by their political power and research about the harmful effects of chemicals. They are undermined by their relative lack of political power compared to large CAFOs and manufacturing companies.

Manufacturing and Chemical Companies, such as the AltaGas Natural Gas Facility in Ripon, want to keep the current status quo, low wages for workers and generate a lot of revenue without having to care about environmental impact. They are motivated by the money they generate, their economic importance, their substantial political power, the lack of concrete data proving the negative effects of chemicals, and the lack of significant environmental protection restrictions. They are undermined by Environmental Protection Laws and Restrictions, new findings about the health risk of chemicals, and laws requiring Chemical and Manufacturing Companies to find and address health risk of their chemicals/processes. (Cheuse, Emma, and James Pew, January 30, 2020).

Residents living in vulnerability zones of Factories/Chemical use/storage Facilities want to live in a safe and clean environment free from health risk resulting from exposure to pollutants and chemicals. They are motivated by community knowledge about the

negative effects of chemicals and by various environmental activist groups. They are undermined by their lack of money and political power, their lack of proper organization, and the lack of concrete data proving the negative effects of chemicals (Cheuse, Emma, and James Pew, January 30, 2020).

Small Farmers who own and farm their own land want high demand for their crops and high crop productivity. They are motivated by knowledge about farming and what chemicals (pesticides) are used, knowledge about market demand, knowledge about working conditions, and the well being of the economy. They are undermined by their lack of money, lack of organization, and Environmental Protection Laws and Restrictions.

Livestock Industries and CAFOs want to retain the current status quo of having high meat production and high profits without being concerned about pollution and waste, as they discharge large amounts of air and water pollution. They are empowered by their large amounts of political power, large amounts of money, strong organization, and weak/insufficient monitoring and information about their facilities. They will be undermined by stronger environmental protection laws and restrictions, increased access to information about their facilities, and increased monitoring of their pollutant and waste emissions (National Resources Defense Council).

5. STAKEHOLDER ACTIONS

Lack of Regulation Enforcement

Eric Luong

When it comes to San Joaquin County, there is very little being done by big stakeholders such as the livestock and agriculture industry or the EPA to improve air and water quality, whereas those affected by the pollution the most, such as the residents and farm workers are trying their best to work with the state and environmental activist groups to reduce pollution.

A big step to combat pollution in San Joaquin County is for the cities and state to enforce regulations and move forward in implementing ways to improve quality of life in these areas. For example, the California State Water Board approved a number of plans to improve water quality such as the Central Valley Basin Plan Amendment that will help management of salt and nitrates (Schechinger, Anne, October 7, 2020) and the San Joaquin Valley Air Pollution Control District working with the state of CA to provide funds to continue to monitor and improve air quality by implementing more trees and shrubs or replacing school buses with zero-emission vehicles (Carroll, Rory, May 13, 2016). While these changes seem to be an improvement on paper, will these really be enforced? Some health and environmental advocates say they focus more on making profits rather than prioritizing clean air and are essentially greenwashing by making it seem that they are actually making a difference and not looking for loopholes and lowering standards.

Stakeholders such as large livestock and cattle facilities(also known as CAFOs) have tried hard to work against stricter regulations while also actively seeking ways to work around them in order to maximize their own profits. Investigations made shows that “Manure from CAFOs contains more than 150 pathogens that have the potential to contaminate water supplies, while fumes and particulate matter elevates rates of asthma, lung disease, and bronchitis among farm workers and people living nearby. Nitrates from animal manure poison drinking water sources and contribute to epic dead zones in sensitive aquatic habitats” (Devine, Jon, and Valerie Baron, November 23, 2020). As an obvious danger to the environment and pollution, corporate CAFOs have been pressuring the EPA to stop investigating. The EPA has not been monitoring many of these CAFOs despite supposedly being regulated by the Clean Water Act that forces the EPA to monitor them. Without being monitored, we have even less information on the effects and how to deal with air and water pollution.

There is plenty of conflict between various stakeholders within the San Joaquin Valley mainly between the regulators(ex. EPA, the state and county) and the regulated(CAFOs, industrial/agricultural facilities). While the ultimate goal is to eliminate air and water pollution, making profits remains the biggest impediment to approach environmental injustices. With companies like the livestock industry fighting against regulations, it makes it more difficult for states and counties to continue to regulate these facilities which ends up making air and water pollution even worse.

6. ROLE OF MEDIA AND BIG ENVIRONMENTAL ORGANIZATIONS

Modern Problems Require Modern Observations

Ju Yeon Kim

Slow disasters in San Joaquin County, especially agricultural hazards, are neither sufficiently nor recently covered by the media and big environmental organizations. Although some media include the name of the county when describing California's drought, air pollution, and more environmental hazards, there are a few articles that solely focus on San Joaquin County itself. Even those that feature the county as its main setting are relatively old. For instance, a LA Times article in 2010 wrote about how Sacramento-San Joaquin Delta was going through "ecological decline" including lower water quality and devastated native fish populations, all because of drilling and pumping water from the river (Boxall). Though the ecological problems resulting from the agricultural water delivery process are still prevalent, they are no longer highlighted in later articles of the LA Times.

Not only the media but also big environmental organizations tend to overlook the impacts of San Joaquin County's slow disasters, not giving the attention they are in need of. It

seems like many organizations stopped paying attention to the county since the early 2000s. San Joaquin County's use of pesticides is notorious, causing serious ecological issues and putting residents' health at risk. Nonetheless, it is hard to find sources that looked upon this issue. The only research source I found is "Every Breath You Take: Airborne Pesticides in the San Joaquin Valley," published in 2001. Similarly, a publication by Clean Water Action features a separate section which suggests improving water quality in the San Joaquin Valley, but it was last modified in 2011 and has not been updated since then (Jaeger). A relatively new report that shed a light on San Joaquin Valley's air pollution was "Undeserved Credit: Why emissions banking in California's San Joaquin Valley puts air quality at risk", published in 2018.

Despite the dire consequences of slow disasters in San Joaquin County, many people are not aware of the need for improvements, partly because of the low coverage of media and big environmental organizations. Considering the importance of awareness in tackling environmental injustice, the public eye has to deviate from San Joaquin County's nickname "center of agriculture" and call attention to the dreadful effects it implies.

7. RECOMMENDED LOCAL ACTIONS

The Fight for Their Own Health

May Weng

There are many problems that need to be addressed and have been addressed on a local level, some of these include air pollution harming infants and unborn children and hazards of local oil and gas production and processing facilities. This section discusses the solutions and the way these issues are being addressed while ranking the recommended actions in order of priority.

Firstly, the issue of air pollution harming infants and unborn children is being addressed through different studies that are being conducted to prove that there is a correlation between the two events. However, there needs to be more action to push for more policies by using this data. The community can take small steps to create a cleaner environment in their homes using air purifiers or reducing air pollution in their community by carpooling. This action needs to be encouraged and it is important for communities to unite in order to successfully make an impact.

Secondly, lead in the air and soil have led to the poisoning of at least 10,426 children in 2018. As discussed in Place Matters, if the community bands together, they can reconstruct their neighborhoods and apply for new housing (Place Matters). While the leading cause of lead poisoning in San Joaquin is the air and soil, having new housing

means they can replace lead-based paint or pipes. With new houses, they can also install air filters, which may reduce the likelihood of children having constant asthma attacks. Although this issue is difficult to address, the community may rally together to create a better environment for them and their children.

Third, air pollution is also caused by highway traffic and it has been recommended to live as far away from the freeway because many cars inevitably pass through the area. This is difficult to change on a local level because it is unlikely that residents will or can afford to move where they want to. As a community, they can try to avoid rush hour traffic, drive at a steady speed, or walk whenever possible to reduce the air pollution coming from the freeway.

Fourth, there is an issue of mercury slowly leaking into the Sacramento-San Joaquin delta. There are strategies that have been submitted to the Environmental Protection Agency by Battelle to address this issue. "Common mercury-contaminated sediment remediation strategies include dredging, capping and natural attenuation. Since each remedial action can result in a change in the physical, chemical and biological conditions of the sediment, it is expected that the speciation and transport properties of mercury might change as the result of implementing a remedial action" ("Management of Mercury Pollution in Sediments"). On a local level, residents of San Joaquin can avoid bodies of water contaminated with mercury and avoid consuming meat that has been contaminated by the water. They should also push for preventative efforts to be made to prevent further mercury from falling into the delta.

Fifth and sixth, the community members at San Joaquin think that environmental health hazards can't be reduced and there are contaminants that lie within the soil and migrate to underground water. This has been addressed through informed individuals who use resources, such as the internet, to teach their community members about current problems. To take this further, San Joaquin County itself and its residents could create groups to regularly inform one another about the harms that are surrounding them in order to encourage more action. On the other hand, the issue of contaminants in

underground water has been addressed by reducing the number of pollutants making it into the runoff water, however, it still needs further action. Residents should be informed about what they dispose of into the water that may come back and harm them.

Lastly, there are hazards of local oil and gas production and processing facilities. It is important to provide more readily accessible information sources for the residents who live in the region. To take this further, San Joaquin should create news networks, apps, tools, and other means of communication to make this easily attainable for residents. This should also be offered in other languages to ensure that everyone is on the same page.

8. RECOMMENDED EXTRA-LOCAL ACTIONS

Represent Us

Tetsuya Vlaming

To make a change action must occur, but change can be greatly affected by the government's involvement or lack thereof. In San Joaquin County there are multiple issues that could benefit from the involvement of federal agencies. The main problems that need to be addressed are Air pollution, water contamination, RMP facilities being possible causes of local fires, and a general lack of knowledge in the county. For large actions to happen though, the residents need the assistance of government officials so that change can be made.

The largest concern when it comes to slow disasters in San Joaquin is air pollution. The harmful effects of the different pollutants in the air that residents have no choice to breathe include: P.M. 2.5 (particulate matter), lead, dust, and whatever else that the nearby traffic on highways kicks up. Air pollution has been researched and found to harm infants and unborn children. To solve this issue other areas have been pushing for a reduction in vehicle miles traveled, reducing reliance on diesel and fossil fuels. In 2012, EPA worked with the California Air Resources Board, the San Joaquin Valley Air Pollution Control District, and the Central Valley Air Quality Coalition to reduce PM2.5. There was also a plan implemented in December of that year to put restrictions on wood-burning and

other sources. "EPA will also be working with the state, air district and communities to develop an updated plan to reduce ozone pollution (smog), which is expected in 2015." (EPA). The air has been found as a large cause of lead poisoning which at high levels can lead to attacks on the brain and central nervous system which can cause compass and even death. Another large factor in air pollution is the nearby freeways which are constantly in use by large transportation companies. If laws were passed that require lower emissions from vehicles or legislation that encourages people to move to hybrid or electric vehicles this could help reduce the amount of pollution being put into the air however the freeway would likely remain quite busy. If California installed monitors that capture regional air pollution, it could possibly help encourage carpooling reducing the number of vehicles passing through.

Another second largest issue is water contamination which is affecting the drinking water of communities in vulnerable zones of CAFOs (MacMullan). A solution that other areas include better monitoring of water quality, stricter environmental protection laws, and stricter enforcement of water quality. San Joaquin residents and their local office can rally together to hold CAFOs responsible for their water pollution and make policies that force them to disclose information. In addition to this, there are also contaminants that lie within the soil and migrate to underground water, to try and mitigate the contamination an installation of a water treatment system and bans of certain pesticides and fertilizers can help a lot. Another option would be to use more animals to replace pesticides such as ducks, chickens, and birds. Our last suggestion would be to relocate animal farms far away from water sources to attempt and reduce/ eradicate animal waste runoff.

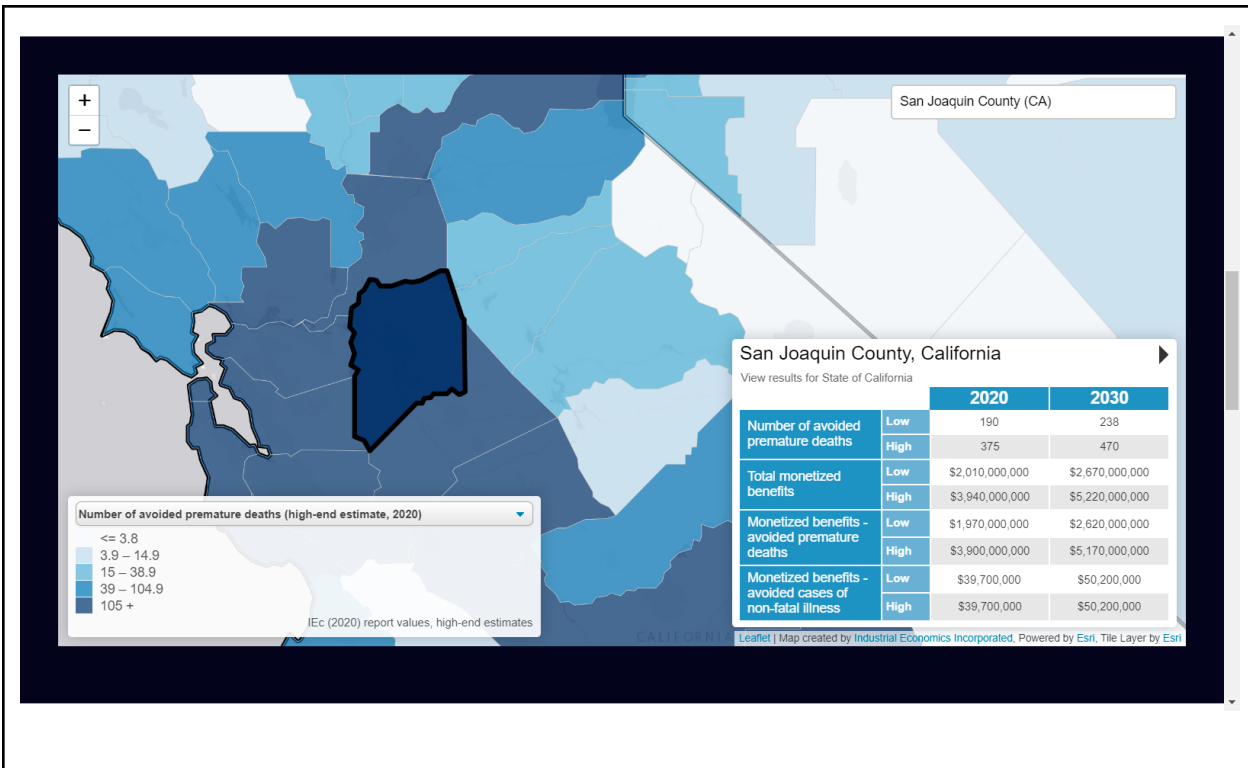


FIGURE 21: The Clean Air Act is protective in San Joaquin County. In 2020, it avoided more than 105 premature deaths in the county, and generated total monetized benefits from \$2,010,000,000 to \$3,940,000,000 which includes monetized benefits from avoided premature deaths and avoided cases of non-fatal illness. The data estimates these numbers to increase by 2030.

Image source: [Clearing the Air: The Benefits of the Clean Air Act | NRDC](#) (Screenshot by Khue Tran, 07/06/ 2021).

9. RECOMMENDATIONS FOR FUTURE RESEARCH

Needed Research for San Joaquin County

Joseph William Garcia

Much research is needed in examining the adverse effects of agricultural soil contamination. With San Joaquin County representing an agricultural-first economy, community residents are negatively affected by the air and soil pollution daily. To establish the overall wellbeing of San Joaquin residents, much attention is required in performing soil contamination tests and understanding the needs of low-income agricultural workers.

Surrounding the high levels of PM2.5, Nitrogen Dioxide, and Ozone throughout the county, there needs to be a formal understanding of long-term carcinogenic effects on agricultural workers and community members alike. There is a lack of proper health-environmental research surrounding low-income agricultural workers. With agricultural workers and their family members being constantly exposed to occupational hazards and daily environmental interactions, these people must have their health checked respectively.

We recommend performing a qualitative research study investigating agricultural workers' attitudes in working in high pollutant areas. This study is called the "San Joaquin

County 1.5-generation Latinx Worker Attitudes Towards Work, Labor, and Environmental Pollution” study. The ultimate research question would ask: Under what conditions do migrant 1.5-generation Latinx agricultural workers view work as a necessity given their constant exposures to high amounts of PM 2.5, Ozone, and Nitrogen Dioxide? This will provide insights into the motivations and understandings of why workers continue to work in these conditions. Additionally, this will give proper information as to how workers are managing their health inside their workplaces, communities, and homes. The purpose is to learn from these different perspectives in order to make the interventions most effective.

With this recommended study focusing on agricultural workers, an emphasis on working with 1.5-generation migrant low-income workers would be plausible. From a transnational perspective, there needs to be an understanding of work attitudes and why these migrant workers came to San Joaquin County in particular. Understanding the health and wellbeing of San Joaquin County residents requires knowledge of motivations and reasons to produce work. Additionally, it'd be beneficial to interview 2 or 3 corporate management on their attitudes towards working in high pollutant areas to understand their perspectives. To ensure the privacy of both groups being studied, necessary measures to de-identify participants and destroy sensitive information will be done upon analysis. The goal here is to receive multiple perspectives on the attitudes of producing work through these environments.

When working with both groups, there's also a strong need for participant observation. The goal would be to work with 4-5 main Latinx interlocutors. Through strong rapport with the Latinx workers, knowledge as to what their workdays are like and familial responsibilities gives an understanding of what they do. Though there's a suggestion of working alongside corporate management, the difficulty lies in observing their work practices due to confidentiality.

To focus on San Joaquin County's broader 1.5-generation Latinx agricultural populational health, we are to use quantitative surveys asking folks to report on their occupational and personal health. We would ask questions like "On a scale through 1-10, how safe do you feel when being exposed to these environmental pollutants (with 1 being not safe to 10 being extremely safe)?" and "On a scale from 1-5, how often do you use lay referral systems to check for cancer-related information and resources (1 being never and 5 being all the time)?" The goal is to get a quantifiable measure as to how these workers feel about their health and perform health-related tasks within highly pollutant areas.

Simultaneous to the Participant Observation and survey methods, it's recommended to build rapport with the agricultural workers through community events and work-related activities. In order to conduct rich ethnographic, focus-group type interviews, there is a need to create an environment that's comfortable and accessible for all participants. Such discussions would cover what a day-to-day looks like, what their processes of moving to San Joaquin County were like, their thoughts on their health exposures to these pollutants, and why they view work as a necessity. As for the corporate members, there's a need to understand their attitudes towards work and labor. Given they have control over agricultural practices and the workers involved, conversations of work tradeoffs need to be instilled. Such discussions would cover safety protocols for corporate leaders and workers and how environmental issues are discussed throughout corporate meetings. The goal of these ethnographic interviews is to understand how each group thinks of themselves, their work, and their priorities within highly pollutant environments.

The purpose of this research recommendation is to further explore vulnerable communities, like migrant Latinx agricultural workers in San Joaquin County, who are responding to hazardous environmental issues. California has a long history of agribusiness involvement and corporations have power in environmental decision making. Rural communities lack proper governance in taking care of themselves throughout these environmental pollutant areas (Jagannath 2018, 3). Taking an environmental research

activist stance allows us to combat the treatment of low-income and highly impacted communities. The topics of health through these migrant workers are intersected through environmental impacts, work and labor, location, and income. To further address how these aspects are themselves social determinants of health, there need to be critical examinations of how these agricultural workers are performing.

The goal of this research project is to also further provide information on San Joaquin County health, environmental, and work/labor information to the Health Plan San Joaquin, a non-profit dedicated to providing citizens of the county accessible health information and Medical knowledge (Health Plan of San Joaquin). Providing them qualitative information regarding health and work attitudes may help in shaping overall working conditions through these hazardous environmental conditions and fighting for workers' health protection rights.

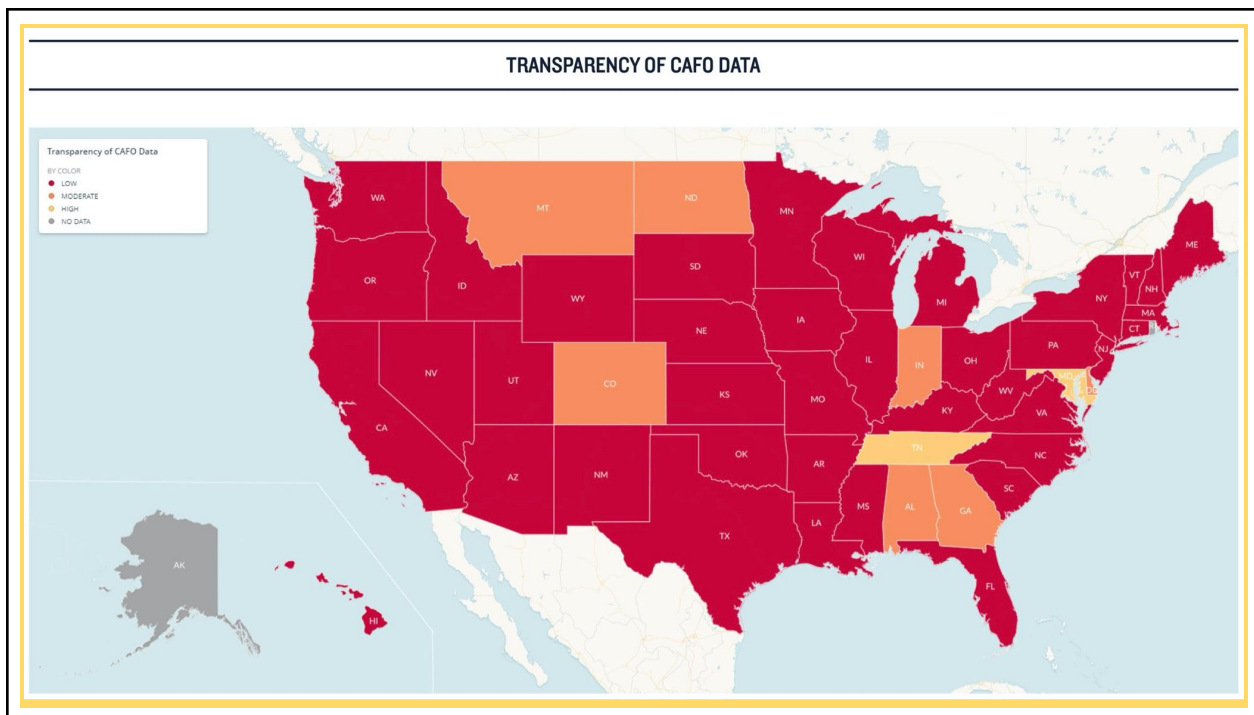


FIGURE 22: Image source:

<https://www.nrdc.org/sites/default/files/cafos-dont-know-hurting-us-report.pdf>

(Screenshot by Ju Yeon Kim, July 6, 2021).

Caption: The figure represents the data transparency of Corporate livestock facilities, or concentrated animal feeding operations (CAFOs) in the U.S. Most of the states have low transparency of CAFO data. Not knowing the exact scale of agricultural industry is concerning since it is a first step to address agricultural pollution and problems. When the researchers tried to find the number of animals confined, they could only find NRDC's data estimating only 29 percent of the EPA's estimated number of CAFOs, which is concerning.

10. INJUSTICE ANALYSIS

Injustices Contributing to Environmental Injustice in San Joaquin County

Residents in San Joaquin County, like residents in all counties, are subject to all of these intersecting injustices. Residents in vulnerability zones of manufacturing companies, chemical plant workers, and poor farmers suffer from data injustice. They lack proper research about the harmful effects of chemicals used by large manufacturing, chemical, or agricultural companies, leading to the Government doing very little about some pollutants, and contributing to environmental injustice. A way to solve this inequality is through laws that make Companies investigate their own chemicals and report about the harmful effects of them (Cheuse, Emma, and James Pew, January 30, 2020).

Residents in vulnerable zones of manufacturing companies, mainly low-income minority communities, chemical plant workers, and poor farmers also suffer from economic injustice. Farm Workers make minimum wage with poor work conditions, while the economy and large companies are generating Billions of dollars in revenue (San Joaquin Council of Governments, n.d.). Big cities emit a lot of pollution that drifts towards San Joaquin. These larger cities often face little repercussions, as they have a lot more money to protest these industries. This leads to the continuity of environmental injustice in lower income communities who cannot fight against large companies. A way that this inequality can be mitigated is through better environmental protection laws and enforcement, better work conditions laws, and better studies on the effects of contaminants in water.

For epistemic injustice, Community studies and some scientific studies are discounted by

Law Makers and Chemicals Companies because they aren't "true experiments" that can prove the negative harmful effects of chemicals on humans. This leads to the continuity of pollutants in the environment, and the subsequent continuity of environmental injustice. A way to mitigate this is through laws and legislations that make it easier for community research and scientific studies to be accepted as true as long as the procedure of conducting such research is valid.

For gender injustice, Gendered job aspects dictate how men and women are environmentally impacted. Following the stereotypical gendered-work division, men have potential control in dictating who works and who doesn't. Occupational hazards in the long-run majorly impact men and women. The emphasis is understanding who works more (outside and in the home) to understand these injustices. This could potentially lead to the lack of understanding of the threats of chemicals, and a further increase in economic injustice between men and women, contributing to residents having less power to fight polluting companies. A way to mitigate this is to have stricter laws that prevent gender discrimination in the workplace. Have LGBTQ+ and Women's Centers be readily available to discuss ways of being environmentally safe and challenging the gendered body-politic (Bell, Karen, October 12, 2016).

For health injustice, in the vulnerability zones of Oil Refineries in San Joaquin County, babies and low-income people of color suffer higher risk of cancer and other diseases. This leads to weaker resistance to environmental injustice since people have to spend money to address these diseases instead of fighting chemical companies. Methods of addressing this injustice are new monitoring and operating requirements to minimize pollution from the harmful burning of waste gas, called flaring and tighter control requirements on emissions from various parts of refineries like delayed coker units and storage tanks (Cheuse, Emma, and James Pew, January 30, 2020).

For infrastructure injustice, there is the repeated use of un-nutrient soil and use of synthetic fertilizers containing harmful chemicals to compensate and the lack of water treatment system in farmlands and facilities. Methods for addressing this injustice are the

use of alternative methods for fertilizers or let the soil rest to recover its nutrition and the installation of water treatment systems and perform periodical checks (Meadows, Robin, July 7, 2017).

For intergenerational injustice, the percentage of children, age 1 - 17, reported to have asthma is 34.3% in San Joaquin County, which is more than double California's percentage of 14% (Healthier San Joaquin). This contributes to the continuity of environmental injustice as it now makes environmental injustice have an even more intergenerational impact. This can be addressed by better environmental protection laws that restrict emissions and by new monitoring and operating requirements to minimize pollution from the harmful burning of waste gas, called flaring.

For media injustice, there is some coverage of the environmental hazards in San Joaquin County from environmental organizations. These enviro-orgs convey the perspectives of residents who live in San Joaquin County/Valley, but there still is not enough attention to pollution. This contributes to environmental injustice as it does not help bring this injustice to light in media attention, and thus prevents it from being well known and addressed. This can be addressed by having more media coverage in big media, possibly through incentives, and having more real action instead of plans and ideas for solutions.

For procedural injustice, those with a higher socioeconomic status have the ability to live far away from plants as opposed to those with low socioeconomic statuses. Those living in these unfavorable conditions are permitted from having access to government support due to high costs and inability to find certain resources. This results in those having real political impact not having to face the consequences of environmental injustice, and thus not addressing it as it isn't an issue for them. This injustice can be addressed by having proper research towards understanding literacy rates and educational attainment; and community-based participatory action towards making a home near plants environmentally sound and safe.

For racial injustice, high levels of contaminants in water are mostly found in small

communities whose majority of the population are Latinx. This can be addressed through better environmental protection laws and stricter enforcement of these laws on a national and local level (Cheuse, Emma, and James Pew, January 30, 2020).

For reproductive injustice, given the unhealthy air quality dispersed throughout San Joaquin County, parents have the concern of their children developing upper respiratory problems and asthma, as the rates of children developing asthma in San Joaquin County is significantly higher compared to the average rates in California (Healthier San Joaquin). This injustice can be addressed through providing community-based information of local clinics to measure children's health and wellbeing, and educating kids and family members to identify their own health risks and provide ways of attaining equitable resources.

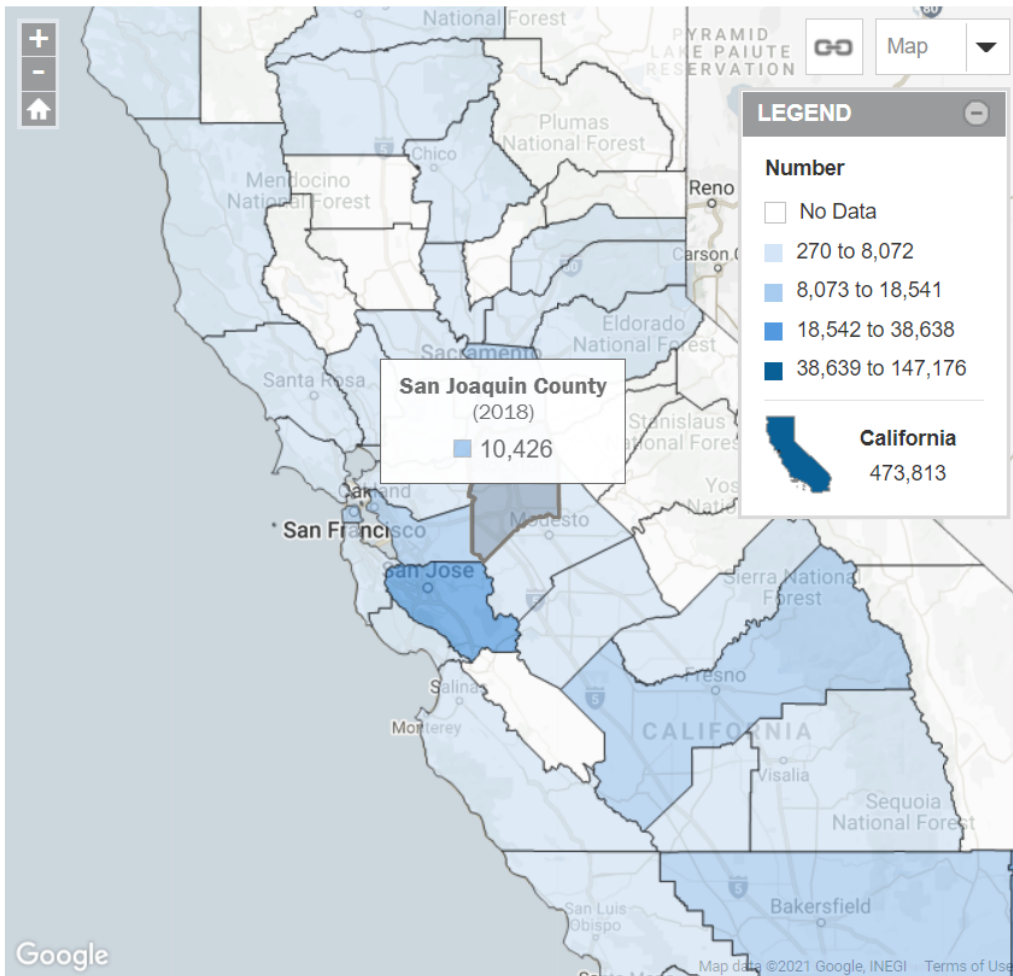


FIGURE 23: According to 2018 data, 10,426 children between the ages of 0-5 in San Joaquin have elevated blood lead levels. Lead exposure could be from paint, dust, soil, and water which creates an unsafe environment to raise healthy children, this is known as reproduction injustice.

Source: [Opportunity Index - The Opportunity Index measures 16 key indicators to produce an overall opportunity score and grade for all 50 states, Washington DC & over 2,900 counties.](#) (Screenshot by Khue Tran, 07/06/ 2021).

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FIGURES

COVER IMAGE

FIGURE 1: ENVIRONMENTAL INJUSTICE CASE STUDY FRAMEWORK

FIGURE 2: MAP OF CALIFORNIA'S COUNTIES

FIGURE 3: MAP SHOWING NATIVE LANDS OF THE COUNTY

FIGURE 4: SETTING PHOTOGRAPH

FIGURE 5: SETTING PHOTOGRAPH

FIGURE 6: USDA COUNTY AGRICULTURAL PROFILE

FIGURE 7: RACE COUNT IN SAN JOAQUIN COUNTY

FIGURE 8: MAP SHOWING POLITICAL PARTY REGISTRATION IN CALIFORNIA

FIGURE 9: US MAP OF VOTING ACCESS

FIGURE 9.5: SAN JOAQUIN VALLEY COMMUNITY WATER SYSTEMS

FIGURE 10: US EPA EJSCREEN CHART SHOWING ENVIRONMENTAL INDICATORS

FIGURE 11: AMERICAN LUNG ASSOCIATION COUNTY REPORT CARD

FIGURE 12: BAD OZONE DAYS

FIGURE 13: ANNUAL PM 2.5 LEVELS

FIGURE 14: US EPA EJSCREEN

FIGURE 15: PROXIMITY TO HIGHWAYS

FIGURE 16: SAFE DRINKING WATER CONTAMINANTS

FIGURE 17: COUNTY OPPORTUNITY INDEX

FIGURE 18: EDUCATIONAL ATTAINMENT

FIGURE 19: K-12 EDUCATION INDICATORS

FIGURE 20: CALIFORNIA HEALTHY PLACES INDEX ON POVERTY LEVELS

FIGURE 21: BENEFITS OF CLEAN AIR ACT

FIGURE 22: CAFO DATA TRANSPARENCY PROBLEMS

FIGURE 23: CHILDHOOD BLOOD LEAD LEVELS