

San Joaquin County

COMBO 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, Tim Schütz, Kaitlyn Rabach, Prerna Srigyan and Maggie Woodruff for the Department of Anthropology, Fall 2020. 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)

Photo of Bobcat fire on September 10, 2020 from a kitchen window in Moravia, California (Los Angeles County). NASA wildfire expert Natasha Stavros “sees the fingerprints of climate change in the Bobcat fire and in California's historic 2020 fire season” ([NASA Earth Observatory 2021](#))

https://commons.wikimedia.org/wiki/File:Bobcat_Fire,_Los_Angeles,_San_Gabriel_Mountains.jpg

BIOGRAPHICAL STATEMENT	PHOTO
<p>May Weng is an upcoming fourth year majoring in Psychology at the University of California, Irvine. She was born and raised in Bangkok, Thailand. She hopes to attend graduate school for clinical psychology. Her interests include listening to true crime podcasts and practicing yoga.</p>	
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<p>Joseph William Garcia is a graduating fourth-year student studying Anthropology at the University of California, Irvine. With passions for community-oriented research and activism, he strives to continuously learn how to implement effective research to combat environmental injustice. In the following months, he is to start the Masters of Science in Information Management graduate program at the University of Washington.</p>	

Tetsuya Vlaming is an upcoming fourth-year student studying Computer Science and Engineering at the University of California, Irvine. To not be ignorant about environmental injustice he decided to learn more about it. His goal at the moment is to graduate and find a job.



Khue Tran is an upcoming fourth-year student at the University of California, Irvine. She majors in Biomedical Engineering with a minor in Mathematics. She is an international and a transfer student from Irvine Valley College. She is going to pursue a master's degree after she graduates.



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INTRODUCTION

This case study report focuses on climate change and the array of environmental hazards it creates and intersects within San Joaquin County.

Climate change causes both fast and slow disasters: Climate change is linked to increased incidence of extreme weather (hurricanes, catastrophic flooding, and dams breaking, for example) and also to slow, less dramatic but still very threatening changes -- in water availability, agricultural productivity, disease incidence, and so on. This is why we refer to climate change as a “combo disaster.”

The case study highlights ways climate change is hitting poor and politically marginalized communities hardest. “San Joaquin County has been the target of multiple types of injustices such as procedural, health, intergenerational, and racial.” (EIJ FALL 2020: Combo Disaster Case Study San Joaquin County (Group 9) 49) In this case study report, how climate change produces such intersecting injustices, which together produce environmental injustice, will be addressed. Intergenerational injustice is a particularly important result of climate change. Intergenerational injustice occurs when decisions and actions by people in one generation (people today, for example) lower the life chances and well-being of people in the future. Also, throughout the course of this report, two necessary approaches to climate change will be introduced: climate change mitigation and climate change adaptation. Climate change mitigation refers to efforts to reduce or prevent the causes of climate change, such as emission of greenhouse gases. Adaptation means efforts to lower the risks or consequences resulting from climatic changes.

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, in your view, is ethically wrong or unjust in this case?

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

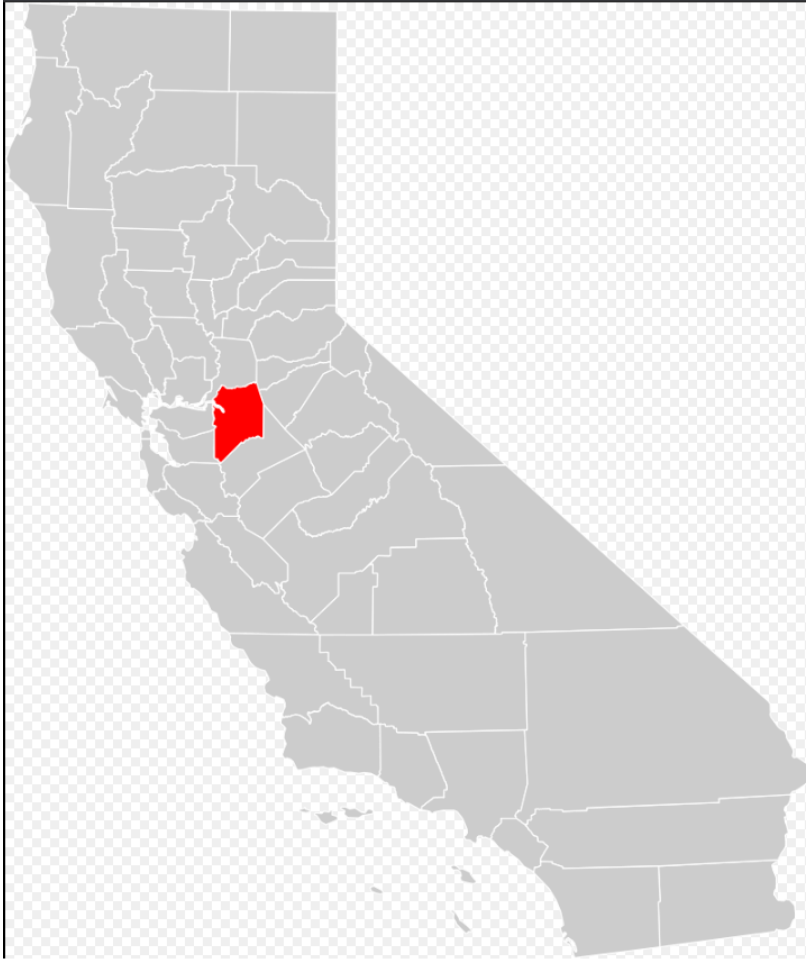


FIGURE 2: This case study takes place in San Joaquin County, which is a mainly agricultural county in Central California, with nearly 920,000 acres of land area, making it the 7th largest producer of Agriculture (San Joaquin Council of Governments, n.d.). Economically, the County is reliant on Agriculture and Manufacturing, producing greenhouse emissions that result in combo disasters in the county. 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.

Source:

https://en.wikipedia.org/wiki/San_Joaquin_County,_California#Economy (Screenshot by Raymond Tu 6/29/2021)

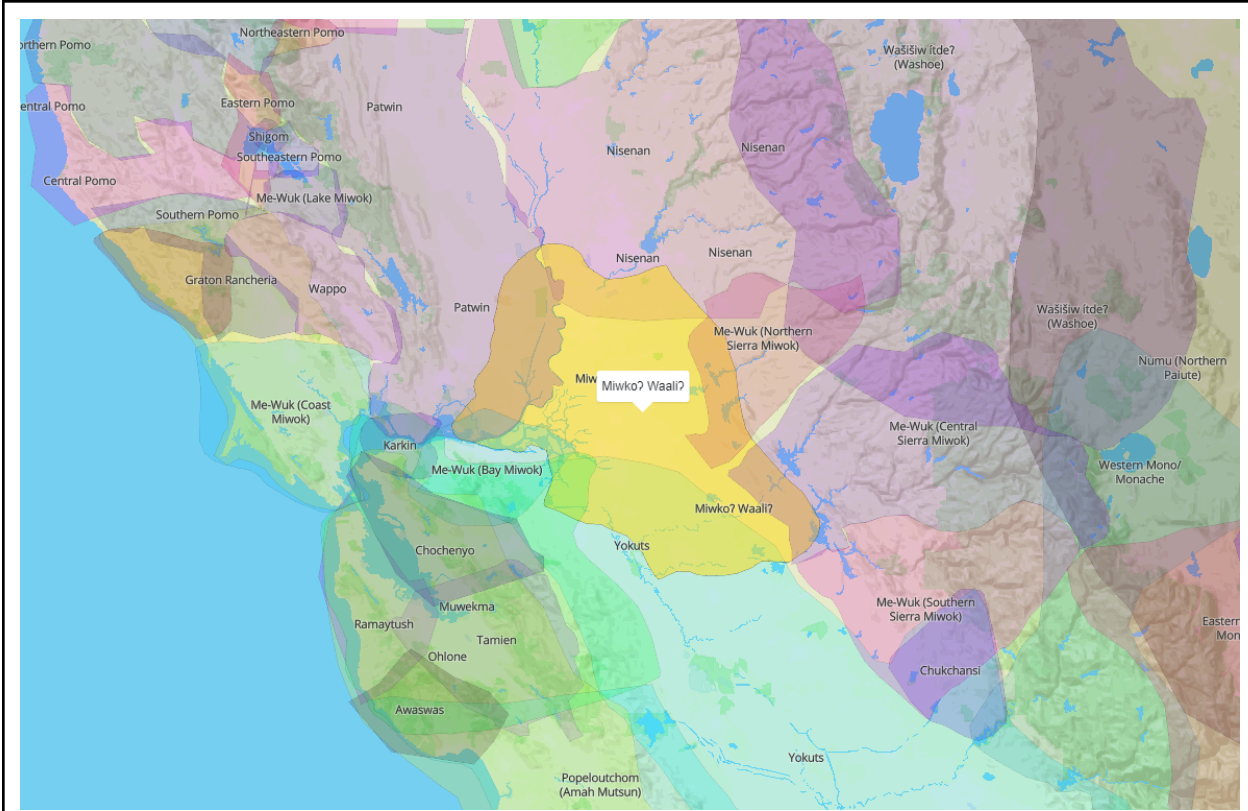


FIGURE 3: Native Lands’ digital maps show San Joaquin’s City of Stockton on Miwok, Yokuts, Waali homelands. The Yokuts tribe established its first reservation in Lemoore, California in 1934. The tribe was officially recognized by Congress in 1988 with the passing of the Indian Gaming Regulatory act. This brought about greater access to improved education and housing, but there are still more improvements needed for people to use their education and knowledge well in climate change planning.
Source: <https://native-land.ca/> (Screenshot by Raymond Tu 6/29/2021)

1. COMMUNITY ASSETS & SETTING

Introduction to San Joaquin County

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. The estimated market value of land and buildings average per farm is \$3,384,002, and the 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 of thousand dollars. This implies that there is a significant wealth divide between the wealthiest and average residents in San Joaquin County since the 5 billion dollars in the

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).

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 is Hispanic or Latino at 42.0%, followed by Caucasian at 30.5%, and Asian at 17.4% (U.S. Census Bureau 2020).

San Joaquin County is also facing significant air and water pollution compared to other California counties. According to the Healthy Places Index, San Joaquin County has healthier clean environment conditions than just 17.9% of other California counties. It also has a lower average amount of ozone in the air during the most polluted 8 hours of summer days than 48.2% of other California counties. Furthermore, San Joaquin County has a lower yearly average of fine particulate matter concentration (very small particles from vehicle tailpipes, tires and brakes, power plants, factories, burning wood, construction dust, and many other sources) than just 10.7% of other California counties. San Joaquin County has a lower average daily amount of particulate pollution from diesel sources than just 23.2% of other California counties and 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.

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 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 are 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).

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 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 on 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 the Social Distancing laws of COVID-19. Folks can still attend the park but must be mindful of the COVID restrictions in the area. Additionally, with certain events being canceled 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 the 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).

For local government programs supporting climate change mitigation, there is the BOOST Program. The Institute for Local Government (ILG) recognizes that Californians should have full access to clean air, water, and transportation, affordable housing, and economic opportunity. However, the ILG recognizes that low-income communities don't have access to these resources and when they're the most vulnerable affected by climate change, the difficulties lie in establishing that security. Their purpose is to build awareness of fund opportunities to tackle climate change, organize projects addressing climate change, optimize resources for community members, strengthen relationships between corporate and community member stakeholders, and transform their approach that looks at long-term strategies against climate change. With ILG being appropriated \$1M for this initiative by the Greenhouse Gas Reduction Fund, complications arise in effectively reaching out and engaging with community members. The COVID pandemic has placed restrictions on traveling and physically organizing community members. Providing information to these resources surrounding what climate change is, how to effectively be eco-conscious, and fight climate change is found online. However, problems are associated when there's a lack of physical mobilization (BOOST Program).

For non-government climate action organizations working in your county, there is the Green Team San Joaquin. It is dedicated to collaborating with private businesses, municipal and county waste divisions, members of the San Joaquin County community, and economic development officials, this climate organization is dedicated to providing accessible economic and environmental services. With the intent of providing information about climate updates to the community and businesses, they make it their priority to center environmental knowledge. Working with businesses and community members is treated as a collaborative setting encompassing different perspectives.

For schools teaching climate change, there is the Environmental Literacy at San Joaquin Office of Education. This initiative brings attention to the need for local educators, administration staff, and students who are versed and having conversations about climate change. Throughout San Joaquin County, more teachers are building relationships with

other teachers in their school districts to discuss ways of fostering a safe environment for discussions of climate change. This initiative brings together teachers, students, and community members alike to learn about methods to combat climate change but effectively mobilizes local members to be educated and lead sustainability efforts.

For cooling centers in San Joaquin County, there is the Spot Youth Respite Center – Women's Center. The Women's Center- Youth and Family Services (WCYF) is a safe space where folks of San Joaquin County can visit for any family-related resources or conflicts. Aiding disadvantaged communities in the county, this Women's Center caters towards all peoples regardless of ethnicity, race, gender, and sexuality. This center provides food centers, cooling services, and tackles homelessness rates for members in the county.



FIGURE 4: This is an image of a hiking trail in San Joaquin County in California. It shows a bit of the diverse ecosystem that is present in San Joaquin County, as there are many

species of plants, trees, and bushes.

Source:

<https://skyaboveus.com/climbing-hiking/Easy-Hikes-in-San-Joaquin-County-California>

(Screenshot by Raymond Tu 7/13/2021)



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.

Image source:

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

(Screen Shot by May Weng)

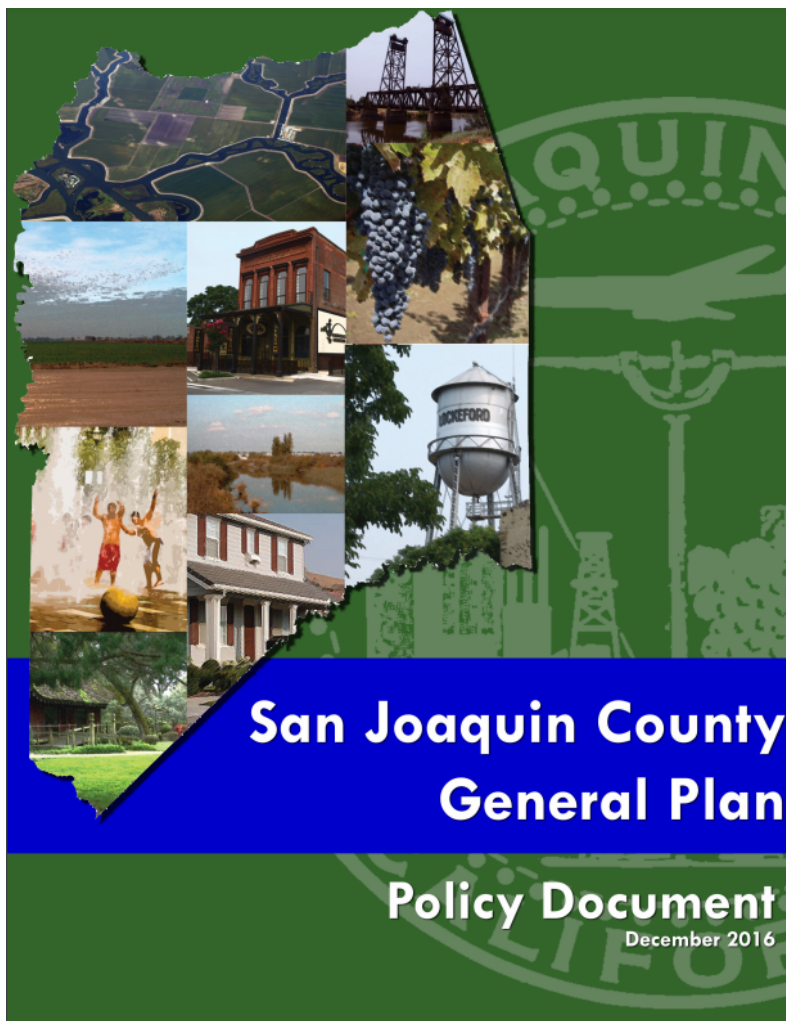


FIGURE 6: This is the cover image for San Joaquin County’s General Plan for the County, including what environmental and community actions they plan to take. One example is planning to manage groundwater sustainably.

Image source:

<https://www.sjgov.org/commdev/cgi-bin/cdyn.exe/file/Planning/General%20Plan%202035/GENERAL%20PLAN%202035.pdf> (Screenshot by Raymond Tu 7/13/2021)

Climate Change in the San Joaquin Valley

A Household and Community Guide to Taking Action



Union of
Concerned Scientists

FIGURE 7: This is a guide to Climate Change in San Joaquin Valley by the Union of Concerned Scientists. It details how the San Joaquin Valley will be one of the warmest places, with drastic increases in the daytime and nighttime temperature projected over the 21st century. Heatwaves, droughts, and flooding will become even more frequent and severe with widespread impacts on everything from infrastructure to health.

Image source: <https://www.ucsusa.org/resources/climate-change-san-joaquin-valley>
(Screenshot by Raymond Tu 7/13/2021)

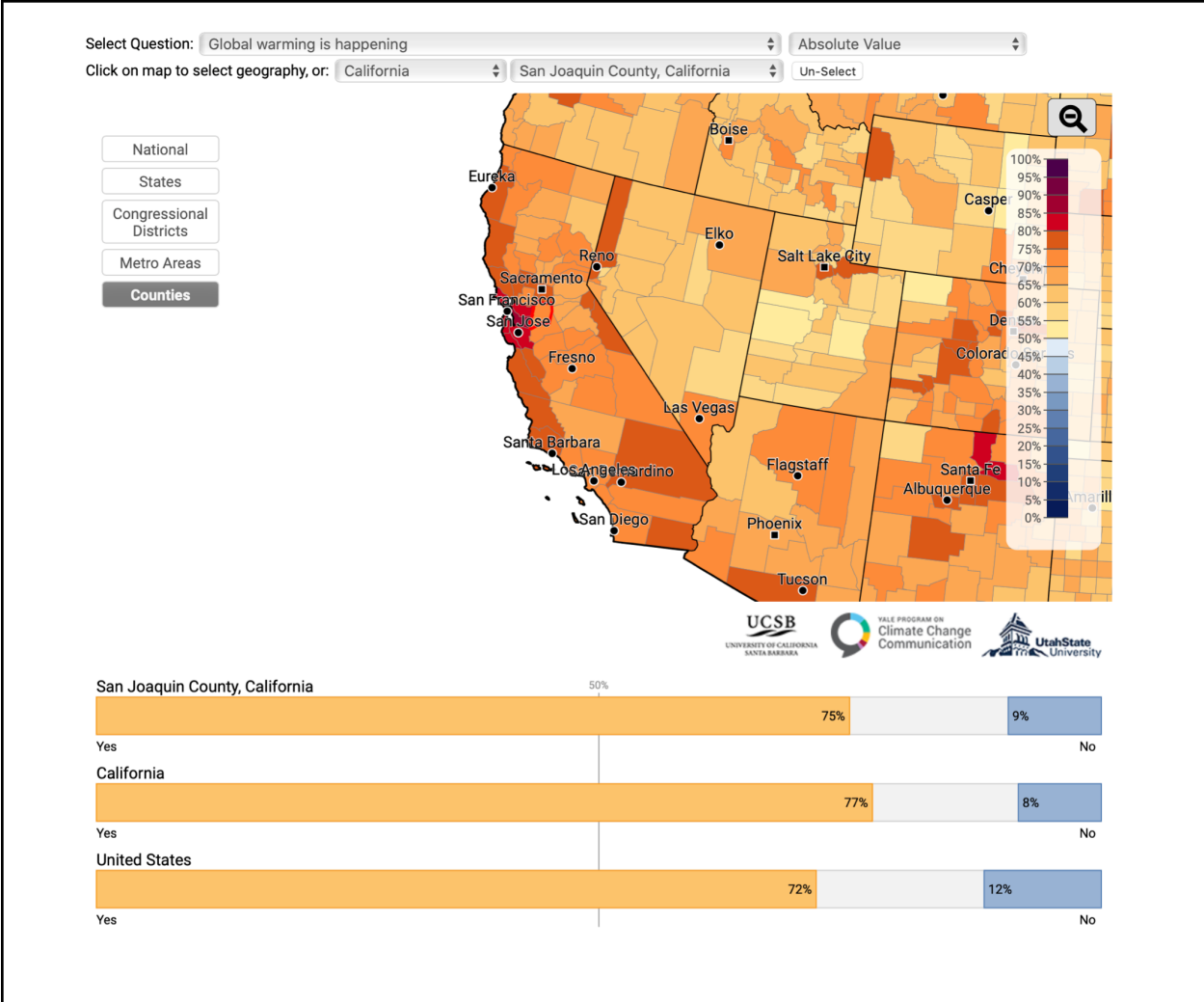


FIGURE 8: This Yale Climate Opinion Map and associated data indicates that 75% of the people in San Joaquin County think that global warming is happening, but only 61% think that global warming is caused by human activities. It also indicates that only 24% of people in the county hear about global warming in the media at least once a week and that 81% of people think that schools should teach more about global warming.

Source: <https://climatecommunication.yale.edu/visualizations-data/ycom-us/>
(Screenshot by Ju Yeon Kim 07/13/2021)

2. FAST DISASTER & OTHER ENVIRONMENTAL THREATS

What Goes Around, Comes Around

Khue Tran

With exceptional intelligence, humans' civilization advanced significantly. They created several industries, powerful machines, secured housing, and convenient tools to serve their needs. However, with an incredible speed of progress comes critical damages to the environment as well as the life of other creatures. Industrialization is the main cause of climate change, which greatly affects the environment as well as people's lives.

In San Joaquin, agriculture is the main industry. It is also the main source of pollution in the county. Industrial farming can release carbon dioxide, methane, nitrous oxide into the air, causing pollution and climate change. Also, nitrate from fertilizer can contaminate water, killing wildlife and pose a threat to human health. All the pollutants from agricultural facilities are estimated to cause \$3 trillion dollars ("10 things you should know"). San Joaquin Valley also published a report stating that greenhouse gases from industrial activities raised global temperature, causing several natural disasters. Pollutants and gas emissions from the agricultural industry can be released in any stage,

from production to distribution, such as fertilizer and pesticide production, transportation, and packaging. The total greenhouse gases emission from agriculture is said to be one-third of the number of greenhouse gases worldwide. For more detailed explanation, below is the full table of greenhouse gases emission breakdown:

Sector	metric tons CO ₂ e	% of Sector Emissions	Cost (\$)
Solid Waste Facilities	103,722	67.1%	105,736
Buildings and Facilities	21,902	14.2%	6,334,811
Employee Commute	18,011	11.7%	-
Vehicle Fleet	9,020	5.8%	2,138,441
Public Lighting	573	0.4%	612,470
Water Delivery Facilities	537	0.3%	335,132
Airport Facilities	394	0.3%	168,769
Mobile Source Refrigerants	230	0.1%	-
Wastewater Facilities	136	0.1%	52,453
Totals	154,524	100%	\$ 9,747,812

Table 1: 2005 Government Operations CO₂e Emissions by Sectors

According to the table above, solid waste contributes two-thirds the amount of CO₂e. This waste includes animal manure, which can release methane gas, breed harmful insects and parasites, and pollute water with bacteria and excess antibiotics.

As a result of pollution, climate change causes drought, temperature rise, extreme heat, wildfires, floods, and rising sea levels. California is extremely vulnerable to heat and wildfires. Fortunately, the San Joaquin fire risk is low.

Nonetheless, the county is expected to have a temperature increase between 3.4 to 6.0 degrees Fahrenheit. Both extreme heat and wildfires can cause heat-related illness, respiratory and cardiovascular diseases, and exacerbate pre-existing conditions. Wildfires can also cause infrastructural, social, and economic damages as well as land slippage and erosion after the fire. Temperature change results from climate change.

It can lead to both floods and droughts due to the melting of snowpack on mountains. Snowpacks are said to have shrunk to nearly nothing, and reservoirs are at only 50% of their average levels. Governor Gavin Newsom has declared a drought emergency in 41 of

the state's 58 counties. Temperatures are surging as the region braces for what is expected to be another record-breaking fire season, while scientists are alarmed about the state's readiness for the impact (Canon 2021).

Drought can increase the risk of landslides or mudslides, and sediment in a run-off that reduces water quality. In addition to fire-related injuries, local and regional transport of smoke, ash, and fine particles increases respiratory and cardiovascular risks. San Joaquin County has tried to prevent wildfires by planting trees as well as proposing plans that restrict the pollutants facilities released into the environment. However, they still have a long way to go. Water scarcity due to drought can limit human food sources, leading to malnutrition and degradation of water quality as well as foodborne and waterborne illness. In fact, the federal report said that during the extensive droughts observed between 2012 and 2016, they observed the concentration of the precipitation in the already-wet winter months which lowers water levels in groundwater aquifers (a layer of rock and sand that is saturated with water) across the valley, further worsening water quality. Increased water extraction concentrates existing contaminants, and moves contaminants closer to wells intakes (Ortiz-Partida 2020, 4). Fortunately, San Joaquin County has built water treatment systems to purify contaminated water, which can help provide and distribute more water to communities and improve its quality.

Lastly, floods due to extreme weather events and sea levels rising increase human health vulnerability. Flooding can bring dirt, toxic chemicals as well as harmful pollutants into water sewage, contaminating it and other water sources. It can also lead to landslides and homes destructions, and mold build-up in buildings, decreasing both water and air quality. Unfortunately, because San Joaquin County is not near the ocean, the county hasn't done much to prevent this scenario. Therefore, when the floods hit, residents won't have enough preparation to respond and evacuate timely.

WHAT ARE THE CLIMATE PROJECTIONS FOR THE NORTHERN CENTRAL VALLEY REGION?

The impact of climate change in California varies across the state due to diversity in biophysical setting, climate, and jurisdictional characteristics. The California Adaptation Planning Guide organized the state into climate impact regions based on county boundaries in combination with projected climate impacts, existing environmental settings, socioeconomic factors, and regional designations and organizations.⁵ Figure 1 is a map of climate impact regions.

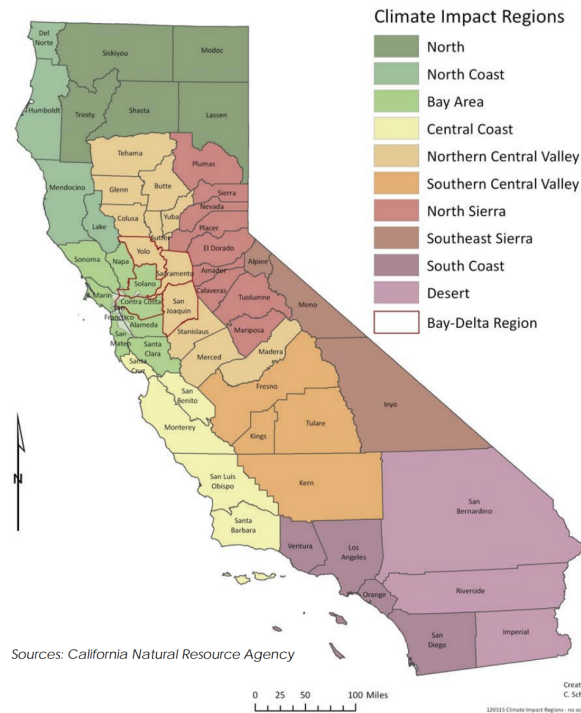


Figure 1. California Climate Impact Regions designated in the *California Climate Adaptation Planning Guide*⁵

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FIGURE 9: This map shows the designation of different climate impact regions from the California Adaptation Planning Guide, in turn, used by California’s Department of Public Health. San Joaquin County is in the “Northern Central Valley” region, which is reported to have a high likelihood of substantial temperature increases over the next century. Increased temperatures and hydrologic extremes are also reported. Image source: [CHPR San Joaquin \(ca.gov\)](http://chpr.ca.gov) (Screenshot by Ju Yeon Kim 07/13/2021).



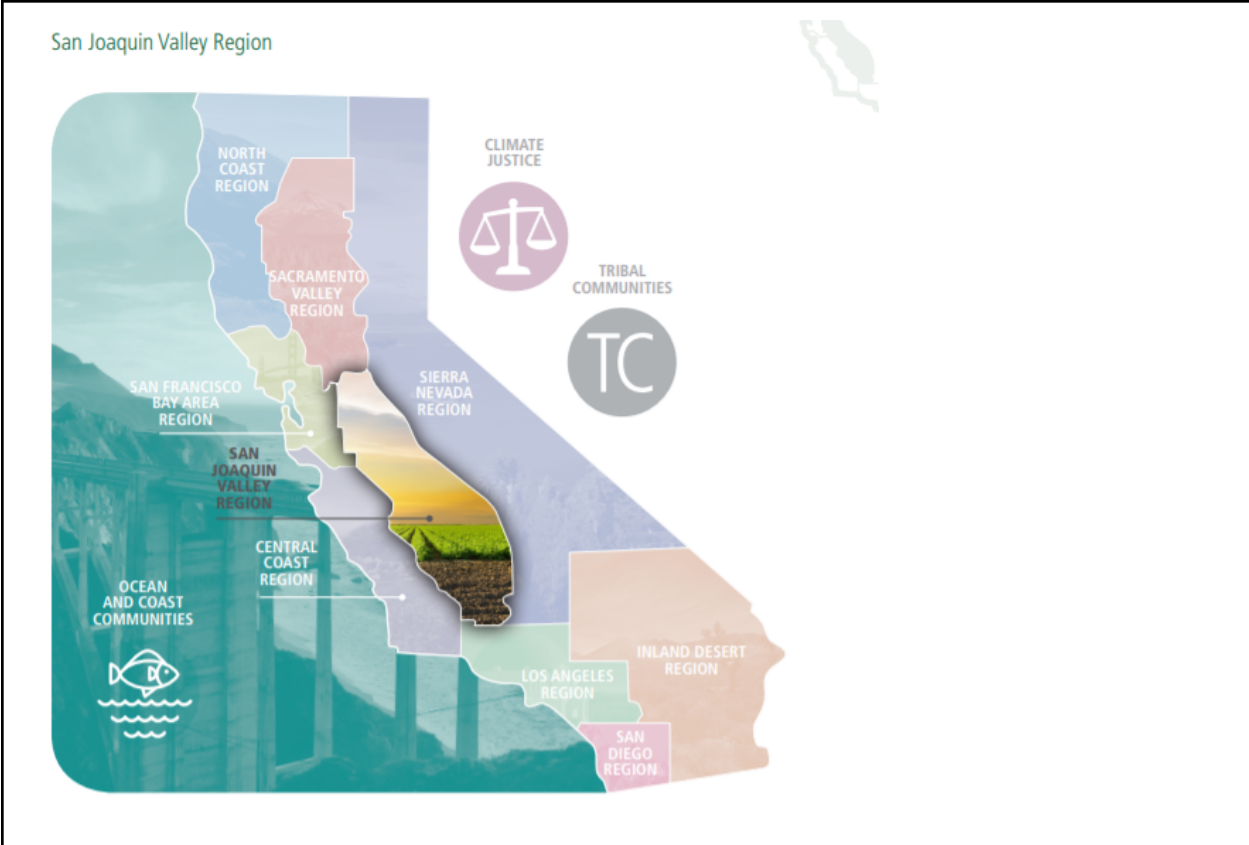


FIGURE 10: The figure portrays San Joaquin County, which was observed in “California’s Fourth Climate Change Assessment.” They found that the San Joaquin would face many impacts due to Climate Change, these included: acceleration of warming across the County, more droughts accelerated sea rise, more heat waves, more severe and frequent fires all of which would put more pressure on the residents living there.
 Image source: <https://www.climateassessment.ca.gov/regions/> (Screenshot by Tetsuya Vlaming 07/13/2021)

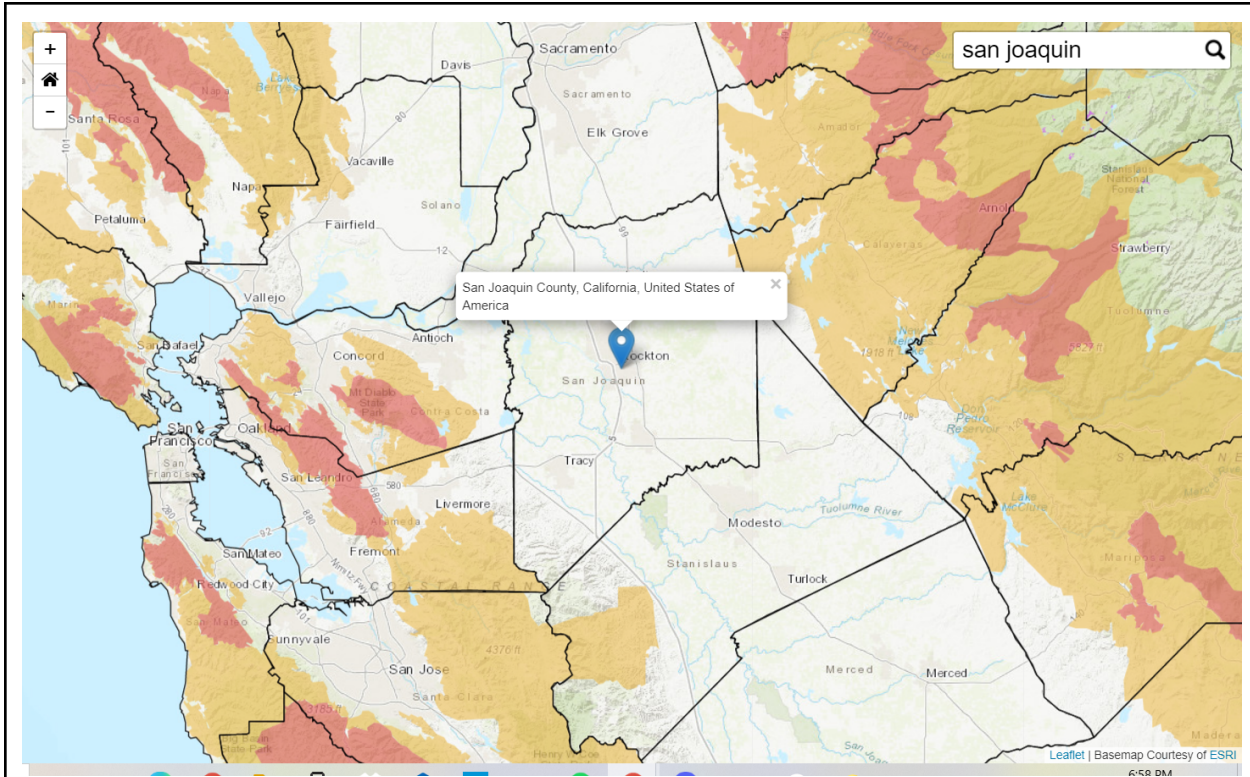


FIGURE 11: While San Joaquin may not be located in a high fire risk zone, red areas being tier 3 and orange being tier 2, it is surrounded by them. This is extremely concerning when considering that when a fire does occur it is likely that San Joaquin will be covered by their smoke.
 Image source: <https://ia.cpuc.ca.gov/firemap/#> (Screenshot by Tetsuya Vlaming, 07/13/2021)

3. COMPOUND VULNERABILITIES

High Risk and Vulnerabilities

May Weng

There are many conditions in the San Joaquin community that increase environmental health vulnerability; these factors are all crucial in understanding the stresses that the community faces on a daily basis. These stressors include poverty, education disparity, water scarcity, racial distribution, and access to health services. Additionally, these factors all have a direct link to climate change, such as the way racial distribution in San Joaquin causes Hispanic communities to be more adversely affected by the adverse effects of climate change.

Climate change disproportionately affects people in low-income communities. The poverty rate of San Joaquin County is 15.2% (“California Poverty by County and Legislative District”). The estimated median household income in 2019 was \$36,690, whereas the estimated household income in California was \$80,440 (“San Joaquin, California”). People who are already burdened by poverty and inequality often suffer the harshest consequences and are less likely to have the means to cope. This combined with education disparity continues to put individuals in an endless cycle of poverty. Compared to the rest of the United States, San Joaquin County has a lower high school graduation rate. 88.5% of the population has an education level of at least 9th grade. Children who

grow up impoverished are more likely to complete fewer years of schooling and earn a much lower income (“Statistics on Poverty and Education in the United States”). Furthermore, many people who grew up in poverty cannot afford to pursue higher education, which limits their opportunities for jobs that will allow them to earn a higher income. This suggests that poverty and education have a bilateral effect on one another.

Another stressor within the community has to do with water scarcity and this also disproportionately affects the Hispanic community as they make up 42% of the races in San Joaquin County (“San Joaquin County, California”). Many people in San Joaquin are facing problems with accessing clean drinking water, which is exacerbated by climate change (Pottinger). According to Race Counts, this county also ranks the 35th most racially disparate county in California (“San Joaquin County Ranks”). Vulnerable and marginalized communities disproportionately face health consequences that are made worse by climate change. This is also intensified by the lack of access to health services in which climate change will bring about new stresses, such as more frequent heat and water stresses. Therefore, the lack of access to health services will make these effects more adverse.

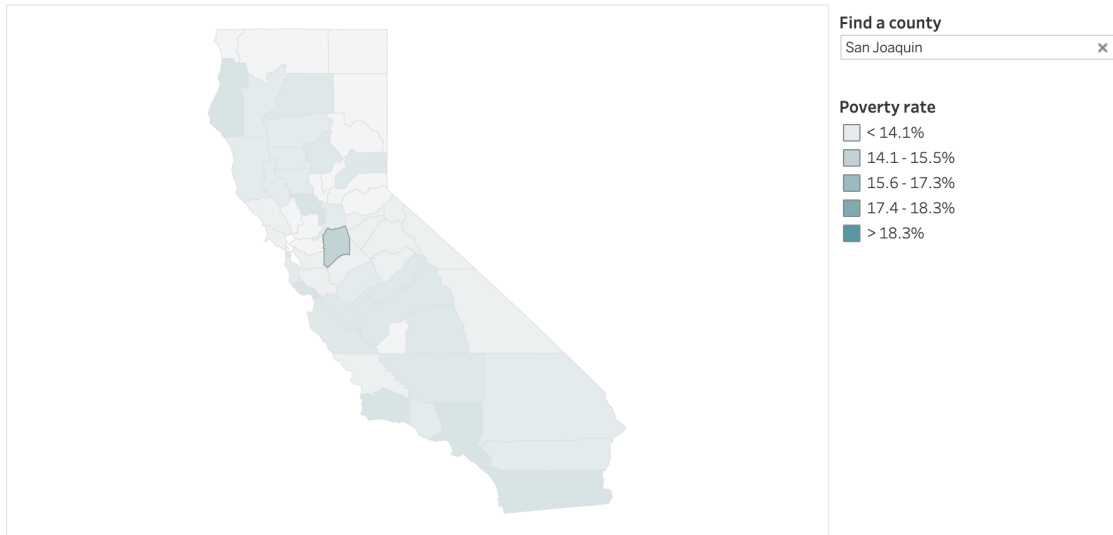
California Poverty by County and Legislative District

These interactive maps show 2016–18 average poverty rates for counties, congressional districts, state senate districts, state assembly districts, and local areas, according to the California Poverty Measure (CPM). The CPM is a joint research effort between PPIC and the Stanford Center on Poverty and Inequality that, unlike the official poverty measure, takes into account the cost of living and resources from social safety net programs.

For more information or questions, please contact Caroline Danielson, Tess Thorman, and Sarah Bohn.

Counties US Congressional Districts State Senate Districts State Assembly Districts Local Areas

California poverty by county



Source: California Poverty Measure (CPM), averaged across 2016-18.

Notes: Please note the margins of error, which reflect uncertainty due to sampling variability. Estimates marked with an asterisk (*) are based on samples of fewer than 2,000 people. Poverty rates for certain counties are calculated at the multi-county level because these counties are not individually identifiable in the data.

Download estimates and notes: <https://www.ppic.org/wp-content/uploads/poverty-across-california-2016-18.xlsx>

From: <https://www.ppic.org/interactive/california-poverty-by-county-and-legislative-district/>

FIGURE 12: The poverty rate of San Joaquin County is 15.2%. With the county being composed of low-income community members mixed with corporate agribusinesses, the county's well known for its economic divide. Poverty levels dictate whether a community has access to many resources and for those in San Joaquin County, there exists a lack of proper water, soil, and vegetation resources at the community level.

Image source:

<https://www.ppic.org/interactive/california-poverty-by-county-and-legislative-district/>
(Screenshot by Joseph William Garcia 07/14/2021)

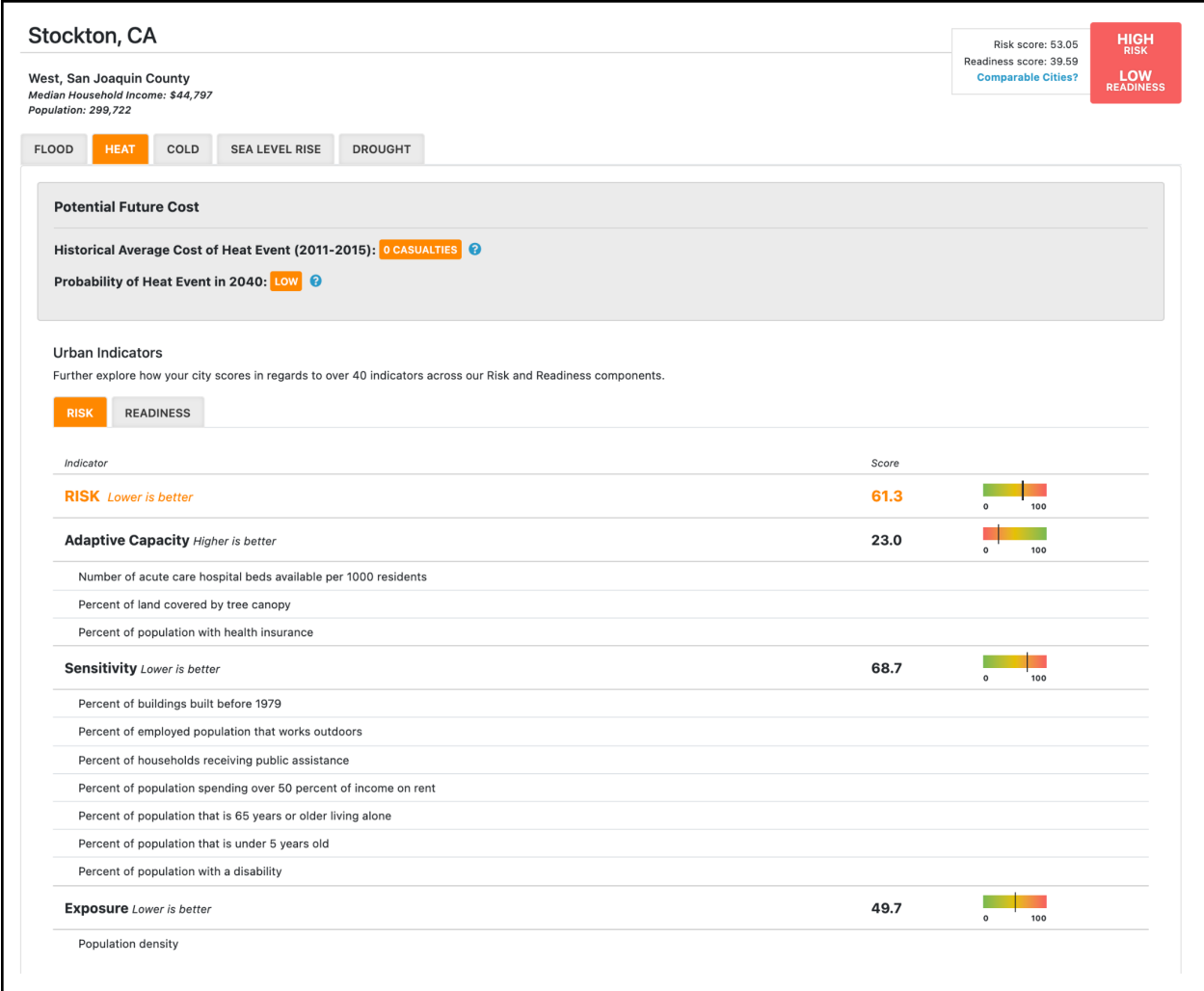


FIGURE 13: Stockton is a city located in San Joaquin County with a High Risk/Low Readiness score provided by the Notre Dame Global Adaptation (ND-GAIN). This measures overall community readiness for the impacts of climate change. The city of Stockton’s high-risk score is based on the Adaptive Capacity relating to the number of acute beds available for patients, sensitivity, and overall exposure.

Image source: https://gain-uaa.nd.edu/1600000US0675000/city_profile/ (Screenshot by Joseph William Garcia 07/14/2021)

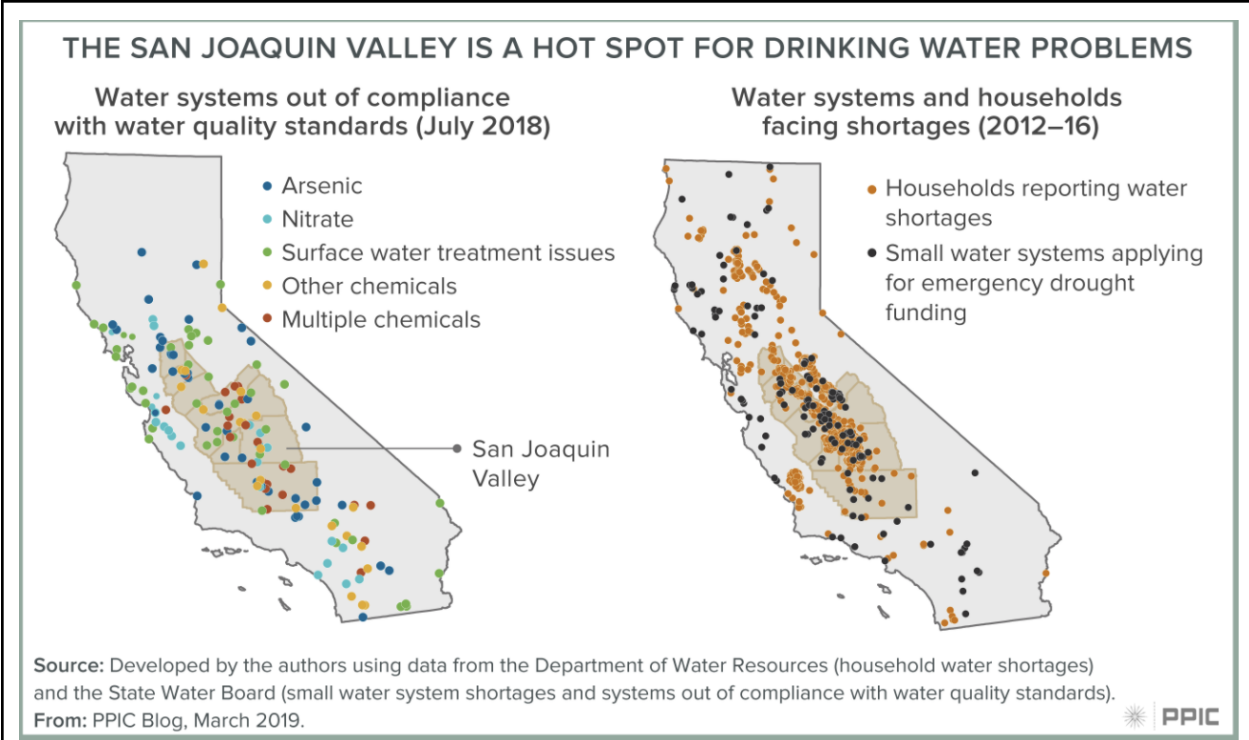


FIGURE 14: San Joaquin County is majorly facing accessible and clean water shortages, majorly impacting low-income people. Their attention needs to be redirected in pushing for community advocacy towards water accessibility at the local and county levels.

Image source:

<https://www.ppic.org/blog/widening-the-conversation-about-safe-drinking-water-in-the-san-joaquin-valley/> (Screenshot by Joseph William Garcia 07/14/2021)

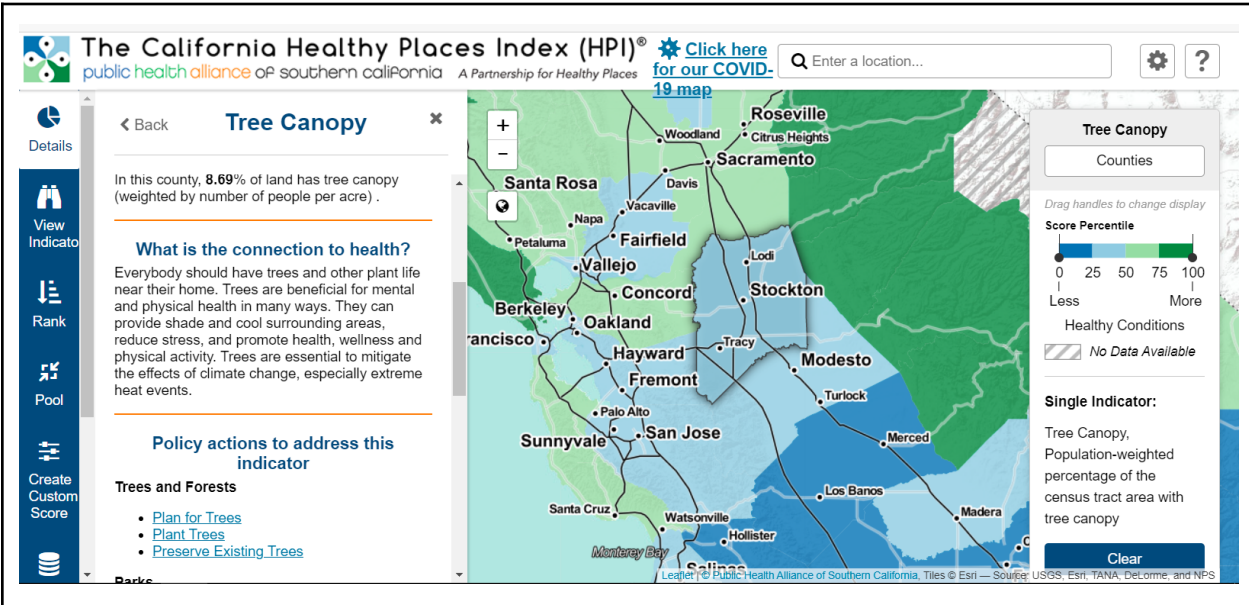


FIGURE 15: This county has a higher percentage of land with tree canopy (weighted by numbers of people per acre) than **39.3%** of other California counties. Trees provide shade and cool surrounding areas, reduce stress, and promote health, wellness, and physical activity. Trees are essential to mitigate the effects of climate change, especially extreme heat events.

Image source: [California Healthy Places Index Map](#) (Screenshot by Khue Tran, 07/13/2021).

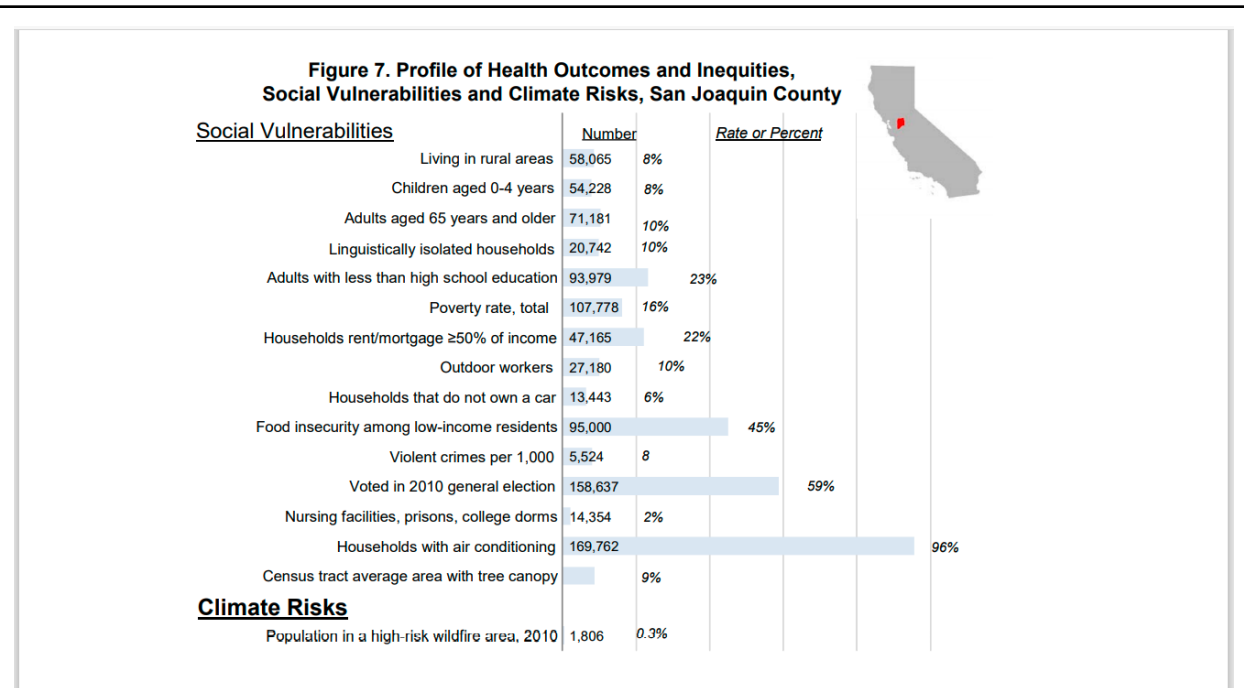


FIGURE 16: San Joaquin residents have 107 heat-related ER cases in every 100,000 ER case. 0.3% of the population, which is nearly 2000 people, live in high-risk wildfire areas.

Image source: [CHPR San Joaquin \(ca.gov\)](#) (Screenshot by Khue Tran, 07/13/2021)

4. STAKEHOLDER ANALYSIS

Introduction to Stakeholders in San Joaquin County

There are various stakeholders, such as Agricultural Companies or poor farmworkers, 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, including gloves, so that they don't get sick and not be able to work, and higher wages. 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 of 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 fewer 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 of the health risk of chemicals, and laws requiring Chemical and Manufacturing Companies to find and address health risks 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 risks 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).

State, Local, and National Governments, want to have a strong economy, while at the same time having a sustainable environment with limited pollution. They also want their residents to have healthy lives and environments, while not undermining the tax revenue generated by large corporations. They are empowered by their law-making power and ability to monitor and regulate corporations. They are undermined by large amounts of money by corporations and their dependence on citizens and corporations for support.

Schools, such as ones in the Escalon Unified School District, want to have a safe and productive environment for students to learn. They also want to have good teachers and adequately prepare students for their future, whether it be in further education or work. They are empowered by their organization, such as in the form of Teacher Unions, and by

community support. They are undermined by their lack of political power and their lack of money.

5. STAKEHOLDER ACTIONS

Little Being Done

Eric Luong

While residents and farm workers of San Joaquin County are heavily affected by the environmental impacts of air and water pollution caused by other stakeholders such as industrial facilities and large livestock and cattle facilities (CAFOs), there is little being done to protect them.

In the past, Mayor Podesto of Stockton in 1999 wanted to privatize access to water in hopes to produce more profits and provide better water management. This power was shifted from the municipality to OMI-Thames, Inc. At the time, OMI-Thames was known as the worst polluter in England and Wales. Also at the time, privatization of access to human rights and necessities such as water, food, etc. was proven to be unsatisfactory in reducing accidents and providing decent services (Grafton, Bernadette, and Paul Mohai, 2015). The people knew this and fought against transferring ownership of the water supply, but Mayor Podesto refused to listen to them.

The Concerned Citizens Coalition of Stockton(CCCoS) and Public Citizen, two groups that allowed the community to be heard, tried to gather signatures to oppose this contract. However, these efforts almost ended in vain due to the fact that the contract was signed before the community had been heard. Three years later, Mayor Podesto would finally

listen to the community and hand over management of the water supply back to the city of Stockton. It was after seeing unsatisfactory efforts from OMI-Thames that the mayor had to get rid of them as the Stockton Municipal Utility Department had been doing better overall.

Farm workers are one of the most impacted stakeholders as they are forced to work directly with many agricultural chemicals as well as having to work in the worst conditions. Many are forced to do farm work to provide for their families as they may not have the time or money to get an education or work elsewhere. When working conditions got worse and their health began to deteriorate, one migrant worker was interviewed and asked if they thought of any solutions. They asked for things like masks and gloves instead of thinking about attacking the source of pollution (Carroll, Rory, 2016). This is most likely due to how bad poverty is especially in combination with pollution. With a greater focus on the need to feed one's family, it is difficult to consider ways to improve quality of life for one's community.

Industrial facilities play a big role in air and water pollution and are often more than not, the main cause of it. One industrial facility, Forward Inc Landfill located in Manteca, is among many in San Joaquin County that are making pollution worse. According to the EPA, Forward Inc Landfill has violated many air pollution laws at its facilities such as not following proper procedures and while also lacking the required permits to have and operate certain machinery that consumes and produces chemicals (EPA 2021). This imposed a large fine on this facility as well as requiring them to take necessary precautions in the future. However, enforcement of these regulations is not strong.

The San Joaquin Valley Air Pollution Control District is attempting to tackle the issue of air quality by working with the state of California to monitor and improve air quality by doing things like planting more trees and shrubs and replacing school buses with zero-emission vehicles. While these actions may or may not make a big difference, their

intentions are not where they should be. Some health and environmental advocates say they are still focusing on profits over clean air and are making themselves seem like they are doing something when in reality, they are actually advocating for lower standards and trying to abuse loopholes in favor of profits (Caroll, Rory, 2016). CAFOs are also among one of the biggest polluters of air and water. The livestock industry is very adamant about having less restrictions on how they operate. With close-proximity livestock, “manure from CAFOs contains more than 150 pathogens that have the potential to contaminate water supplies, while fumes and particulate matter elevate rates of asthma, lung disease, and bronchitis among farm workers and people living nearby” , it is a high risk to pollution. CAFOs are generally regulated by the EPA under the Clean Water Act, but research conducted by the NRDC shows that the EPA has not been monitoring many of these facilities (Devine, Jon, and Valerie, Baron, 2020). With regulations in place, and no one to enforce them, this is a great danger to pollution and climate change.

With all these different stakeholders in this county, little is actually being done to attack the source of pollution or even try to manage the effects of pollution. It seems that over time, things are seen as dangerous and are left alone which furthers the impacts made on the environment and its people, the ones who will experience it the most.

6. ROLE OF MEDIA AND BIG ENVIRONMENTAL ORGANIZATIONS

The Media Combines San Joaquin County's Combo Disasters into a State-Level Climate Change

Ju Yeon Kim

Although the public notices serious climate change in California, combo disasters in San Joaquin County are not highlighted enough by the media and big environmental organizations. Constant environmental hazards in the area are often identified as California's combo disasters as a whole, and they get more attention when grouped together.

Sources like Los Angeles Times, the largest American newspaper headquartered on the West Coast, directly warns about climate change in California. One article explains that "California has already warmed 1 to 2 degrees since the beginning of the 20th century as a result of the human-caused buildup of greenhouse gases. That figure could rise to between 5.6 degrees and 8.8 degrees by 2100, depending on the amount and rate of pollution spewed into the atmosphere, according to the report." (Barboza) The heat waves that result in wildfires and sea-level rise will also "cause 6,700 to 11,300 more

heat-related deaths annually in California by midcentury” and will “dominate economic damage to the state from climate change, costing up to \$50 billion a year by midcentury.” (Barboza)

The Climate Reality Project, one of the big environmental organizations, also says “The San Joaquin/Sacramento River Delta and the San Francisco Bay were found to be “particularly vulnerable to sea-level rise and changes in salinity, temperature, and runoff” by the National Climate Assessment, meaning that as sea levels rise, the nearly 30 million Californians who use these systems could see their drinking water become contaminated with salt.” (How Climate Change is Affecting California)

When depicting climate change in California, the media and big environmental organizations tend to pay attention to both climate change mitigation and adaptation, trying to address the direct causes of climate change and lower the risks caused by climate change. Though these articles mentioned California’s serious climate change, they do not go into details at the county level. San Joaquin County’s hazards are merely implied just because the county is part of the state.

Even the Wikipedia page of San Joaquin County seems to be unaware of climate change in the area, as it never discusses anything about environmental hazards. In fact, although the page explains how agriculture takes up a big part of the county’s economy, it does not say a word about the consequences resulting from industrial agriculture.

Only a few articles focus on how combo disasters affect San Joaquin County. Sierra Club’s magazine article introduces how wildlife in San Joaquin River was destroyed: “as California’s population grows, water shortages deepen, and the impacts of climate change intensify,” Chinook salmon’s migration was cut short and its habitat was greatly disrupted. (Miller)

Another example also comes from the Sierra Club. A post tells the readers how “California PUC decision approved a set of pilot programs to move 1,600 households in low-income

communities in the San Joaquin Valley off of costly and polluting fossil fuels (propane and wood), leapfrog over gas, and fully electrify their homes.” (CA PUC Victory)

In conclusion, despite the moderate or high amount of media exposure that California's climate change receives, San Joaquin County's combo disasters require more attention as climate change worsens the area's wildlife and residents' health.

7. RECOMMENDED LOCAL ACTIONS

Voicing Their Concerns

May Weng, Joseph William Garcia and Khue Tran

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.

With the discrepancies between local organizations and federal policies, the fight towards environmental justice is difficult. Members of the San Joaquin County report education levels of almost 100% completing high school while less than 50% attaining a Bachelor's Degree ("San Joaquin County, California Education Data"). With a focus on community-based educational and information programs, residents will have the knowledge to utilize these resources for their environmental wellbeing. The emphasis towards providing accessible and understandable information is needed immensely.

Firstly, the issue of air pollution harming infants and unborn children is being addressed through different studies establishing correlations 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 reduce overall air pollution.

Secondly, lead in the air and soil has 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 found in air and soil, having new housing leads to replacing lead-based paint or pipes. With new houses, they can also install air filters, which can 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. The need for safe and positive environmental wellbeing also includes the physicalities of safe housing infrastructure.

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. At the community level, folks can avoid rush hour traffic by carpooling, drive at a steady speed, walk, and bike whenever possible to reduce the air pollution coming from the freeway. Additionally, community-based organizations can take a stand towards ride-share services limiting the emission of toxic emissions on 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 (EPA) 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"). At the 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. To address this issue, the county can utilize online news-information sessions like *Stockton Record* or *Stockton News of ABC* to push updated environmental information to the community to effectively challenge and shape community perceptions, and types of environmental information must be presented locally, credibly, and impactfully. 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.

Seventh, 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. With a focus on community engagement to provide forms of accessible environmental and policy-related information, this can greatly impact an individual's ability to effectively mobilize against these environmental injustices. Further, San Joaquin should create news networks, apps, tools, and other means of communication to make this information easily attainable for residents. These sets of information should also be offered in other languages to ensure that everyone is on the same page. Another course of action is to have community organizations partner with environmental and social groups at the local level to mobilize. One such example is collaborating with the Certified Unified Program Agencies (CUPA) to teach folks how to determine the level of detail in RMP facilities, review RMPs, and provide public access to community members (CUPA).

Eighth, actions from authorities are needed to improve local citizens' health and safety. For residents who live very near high-risk industrial facilities and for anyone who's

currently homeless, community resources and plans should teach folks how to manage their houses and be environmentally aware. The county can also create community-centered weekly events on how to properly and effectively buy out homes for relocation. Questions about the event and relocation can be about the appropriate location and possible resources to help them get a shelter and eventually a home.

Lastly, to understand more about local power plant facilities, their procedures, chemicals used, and potential risk, sites like EPA Ejscreen should be widely known to the public so they can check facilities and air qualities around them. Moreover, companies and communities can provide people, especially those who are within the fenceline zone, safety knowledge on how to properly be safe while preventing the risk of immediate/long-term injuries. They should address it in simple terms but still be able to convey important information.

This installation project is supposed to view the double-edged sword being an agribusiness first and a negatively impacted environmental county. Using an ironic language, this project is supposed to see these environmental impacts as something that's passive when in actuality it's not. The goal is to start making people cognizant of how they're treating their environments and how they're also impacted. Ultimately, there will be three installations to the project.

The first installation of the project deals with air pollution. Here folks can see a mural or photograph dedicated to an agricultural corporate businessman inhaling clean air exclaiming "The air is crisp and clear today". Beside this side would be a mural or photograph coughing and showing complications to breathe. The purpose of this installation is to show how disadvantaged communities are really being impacted while showcasing the ironies of agribusiness success.

The second installation is to showcase the same community members sourcing clean drinking water. We could showcase a mural or photograph of folks sourcing and using polluted water for activities of bathing, cleaning, and drinking water. Folks in this

installation would give a grim saying “At least we have water”. This would showcase how communities are subjected to these water systems on a daily basis and represent the idea that this type of water is what they have right now. The last installation is to finally showcase these community members as being the most at risk for wildfires. Those near highly vegetated areas are subjected to being affected from wildfires if there was a catastrophe. We would showcase a mural or photograph detailing dry lands with a sign saying “Prone to Wildfires”. A community member will follow with the saying “At least we have a roof over our head”. The installation is supposed to end with the intention of people seeing the environmental realities low-income and disadvantaged people are forced to deal with. The main mission is to make people aware of these issues while informing folks that climate change is a real problem with detrimental effects.

One area will be located in elementary schools throughout the San Joaquin County school district. This gives a good opportunity for students to see how the environment really impacts themselves and their families. This exhibit is supposed to be a two-day art exhibition hosted in the auditorium and library areas. Students will go with their teachers to see these installations for thirty minutes allowing multiple classes to see at each time. Another area will be located at the university level. Utilizing proper student hangouts and libraries, students will be able to see this installation through for a week-long. Students can come at any time during the day for however many times they want. The rationale is for students to be aware of these issues and become environmentally cognizant as a result. The last area will be located throughout San Joaquin County environmental organizations’ websites. This will serve as a short-term project where people can readily access the mini exhibit. The art project will be up for a month allowing folks to openly discuss and visually look together if needed. The purpose is for those utilizing these environmental sites or are activists and researchers, to critically look at this piece and provide a sense of action. Because there exists irony in this activism, this would be a good encouraging point for mobilization and activism.

At the educational level, we will encourage outreach by making our own art prints for souvenirs. The idea itself is morbid, however it can bring the incentive to attend the project even if the material is highly serious. At the organizational website level, we encourage activists and researchers to look at it as it will critically shape their own mobilization and work. This project will serve as another outlet for how folks think and categorize mobilization. The incentive here is gaining a new perspective.

The ultimate goal of this project is to make people question their own normalities about the environment. In San Joaquin County, disadvantaged communities are greatly being impacted and because there's a lack of attention towards how they're doing, it gives an understanding that change is needed. Mobilization and effective action will take time, however, the impression of this installation is to make people start questioning perspectives.

To make sure that our project is consistent and reflective of the issues these communities face, we are to closely work with these communities and gain their oral histories. Oral histories reveal intergenerational involvements with policy, culture, and respectively environment. We are to utilize talk-stories and oral histories for the sake of creating environmental accuracy in this project. We don't want to misrepresent and incorrectly identify any aspects of our project.

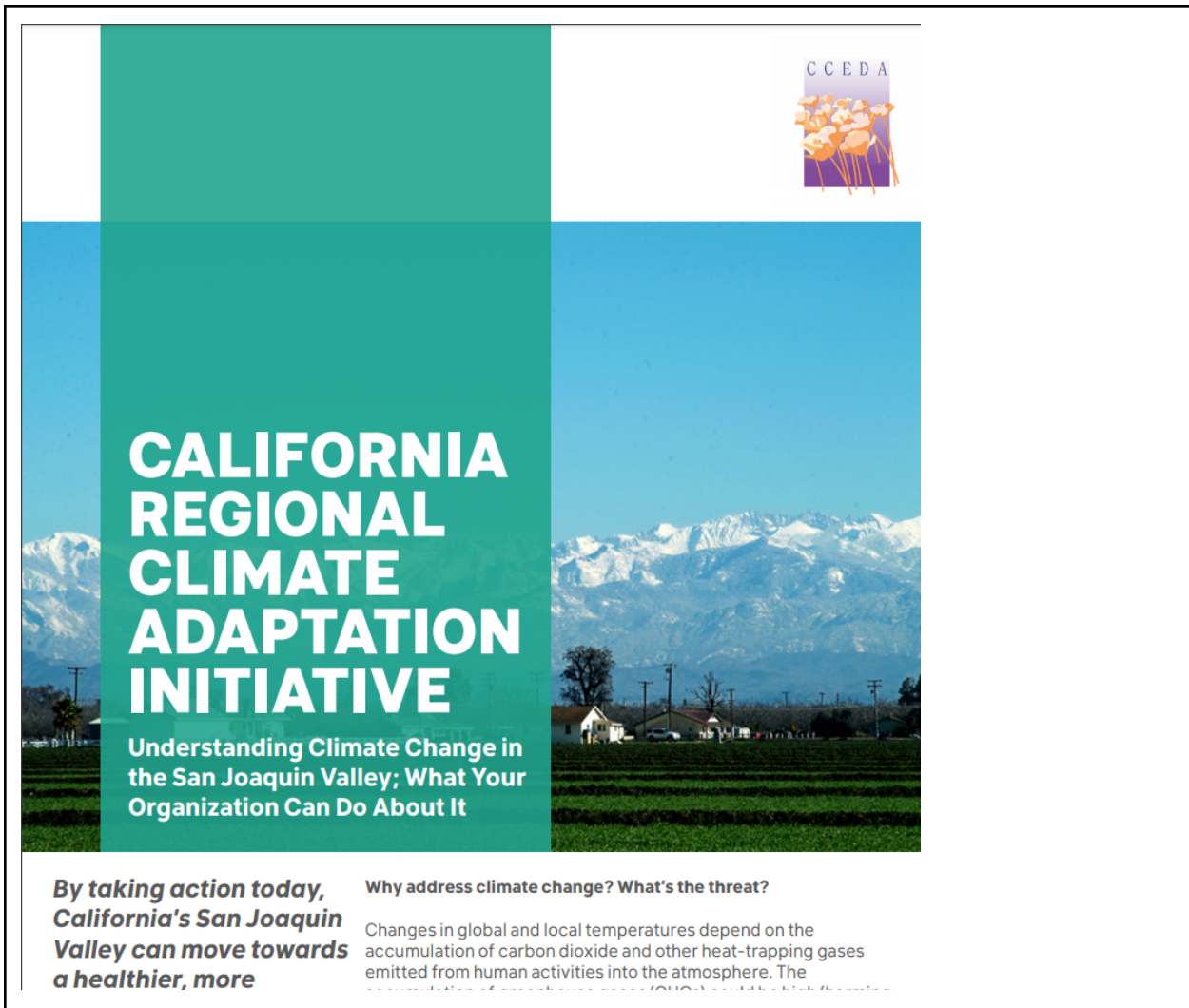


FIGURE 17: In October of 2020, this report was published detailing San Joaquin County’s plans to adapt to Climate Change. It details major problems such as flooding, and access to water, along with actions taken to mitigate these problems: Senate Bill 32 (2016) requires California Air Resources Board (CARB) to reduce greenhouse gas emissions to 40% below 1990 levels by 2030.

Image source:

https://www.climateresolve.org/wp-content/uploads/2020/10/FactSheet_SanJoaquinValley.pdf (Screenshot by Raymond Tu 7/14/2021)

Air Quality Alert

UPDATED

Friday, November 16, 2018

- The San Joaquin Valley Air Pollution Control District has issued an Air Quality Alert due to smoke impacts from surrounding fires. This Air Quality Alert is in effect until Tuesday November 20 at 1200 PST.
- Exposure to particle pollution can cause serious health problems, aggravate lung disease, cause asthma attacks and acute bronchitis, and increase risk of respiratory infections.
- Residents are advised to use caution as conditions warrant. Additionally, older adults and children should avoid prolonged exposure, strenuous activities, or heavy exertion, as conditions dictate.

Counties included:

- Merced
- Madera
- Fresno
- Kings
- Tulare
- Stanislaus
- San Joaquin
- Valley portion of Kern County



FIGURE 18: The following is an image of an Air Quality Alert issued by San Joaquin Valley Air Pollution Control District. It supports our study in section 7B, because it informs people about the effects of air pollution.

Image source: Stanislaus County Sheriff's Office (Screenshot by Raymond Tu 07/14/ 2021).

8. RECOMMENDED EXTRA-LOCAL ACTIONS

Time for Actions

Tetsuya Vlaming

As climate change continues to get worse new policies are needed to prevent a future where change is no longer possible. To make change throughout the United States on a national scale Biden's administration could take administrative action which would then have an impact globally.

The first large step that could be taken would be a policy collaboration with stakeholders such as Manufacturing Companies, Agriculture Corps, and Oil Refineries, to reduce their emissions with incentives such as tax reductions. This would help San Joaquin through a reduction in the number of vehicles transporting produce and could also help with reducing the pollution emitted by these corporations. However, this will likely be opposed by the corporations themselves, or people opposed to corporations paying fewer taxes. I

n addition to the policy collaboration, a new policy that enforces stricter occupational safety standards will stop workplace injuries and possibly allow workers to have a healthier working environment.

The third action that Biden's administration can take would be to rejoin the Paris Agreement (Friedman 2020). In doing so it may slow down the pollution from Manufacturing Companies, Agriculture Corps, and Oil Refineries in San Joaquin all across the nation. This action would create more rules that corporations would have to follow to lower their greenhouse gas emissions. Obviously, these corporations would not be content with these policies and would try to push back which is likely why the United States is not currently a part of the Paris Agreement. These same corporations who pollute and contribute to Climate Change are also the backbone of America's economic system.

The fourth action that could be taken would be to reverse the energy policy put into place by the Trump administration. He could do this by implementing a Clean Power Plan 2.0 with, "a more ambitious rule, one that would put the country on a path to meeting the president-elect's goal of eliminating carbon emissions from the electricity sector by 2035," (Phillips 2020). Similarly, a fifth action plan would revise the rules of the use of fossil fuels. While this would reduce pollution through reducing the burning of them, oil refineries and Natural Gas companies will surely push back.

While the change will be difficult for the Biden Administration, we remain hopeful that they are ambitious and attempt to save our planet from climate change. Whether or not they implement plans making enough of a difference can dictate the state of climate change in years to come.

9. RECOMMENDATIONS FOR FUTURE RESEARCH

San Joaquin County Chronic Health Stressors, Water Regulations, and Climate Change

Joseph William Garcia

Addressing the ecological conditions of people in San Joaquin County also requires a strong need for research surrounding how community members are responding to these environments. Examining the social climate interactions, there's a strong lack of how people in the county are responding to the effects of climate change and pollution in their own water systems. Effects of constant water pollution have been prevalent through climate change reports showcasing the extremities of what folks have to deal with in the county.

Over time, excessive exposure to poor water qualities leads to the development of chronic diseases which include cancer. The dimensions of health, a person's access to clean water, and climate change are all intersected. There is a strong need for health and assessment reports detailing the effects of long-term exposure to water pollutants in San Joaquin County. Utilizing this type of report will also give insights into the intergenerational aspects of climate change and how they've been adversely affecting these disadvantaged

communities.

Working on a future research project requires a multi-methods approach of quantitative and qualitative research methods. Surveys allow us to get a general understanding of how members of the community are responding to their environments. Survey data is needed in understanding the long-term and intergenerational impacts of water pollution on people's health. Focusing on intergenerational aspects provides insights into how long people have been dealing with these water systems and what chronic conditions have been presented over time. Such questions would ask: how many days of the week are spent filtering and cleaning water, how many family members have succumbed to chronic diseases, and how safe they feel surrounding these water pollutants. The goal of this survey is to understand how people are managing these water systems, their health, and are affected by long-term climate change throughout the county. Estimates help to understand what communities are going through and what protocols are needed for that specific region in the county.

In addition to the quantitative aspect of this study, there's a strong need for a qualitative study. This initial study is titled "Health Stressors and Water Systems in San Joaquin County" and it's an ecosocial ethnographic project. This research question asks: "Under what conditions does climate change serve as a chronic health stressor to folks in San Joaquin County using polluted water systems?" The two social groups that are to be studied are low-income, disadvantaged members of San Joaquin County and water management systems.

To connect with these social groups requires constant efforts in rapport and maintaining these relationships. For low-income, disadvantaged community members of the county, we're to connect with them through community environmental meetings and events discussing ways of improving their water regulation systems. To make sure that they're comfortable with the research, the importance lies in informing goals and emphasizing the

importance of de-identifying personal information and keeping it confidential. Additionally, this project is to connect with water management professionals to understand their responsibilities and attitudes towards water regulation in San Joaquin County. Access will be gained by constant communication between the researcher and these officials usually by email or by environmental-organizational connections. To protect their privacy and selves, all sensitive information will also be de-identified and kept confidential.

Part of the qualitative methodology is utilizing participant observation. This research study is to ask how these water systems become a chronic health stressor to disadvantaged community members. Participant observation is the most useful in seeing what practices these community members do to treat these polluted waters, how they provide water to their families, and where these polluted water systems are coming from. For example, the EPA requires community water systems to provide clean water to these communities and requires community members to understand how to read these quality reports (Partida et. al 2020, 8). Participant observation would help to understand how these community members are internalizing and interacting with these information reports. If allowed, this study is to observe the daily practices of water management officials and their regulation systems for members of the county. Here, daily assignments and activities are supposed to be shown especially towards San Joaquin County.

In addition to participant observation, ethnographic-based interviews are to be utilized. This method allows for researchers to understand the motivations, reasonings, frustrations, and perceptions of one's own health through the use of these polluted water systems. When working with low-income, disadvantaged communities there's a need to understand why they continue to use these water sources given their high polluted rates. Additionally, talking about one's health through these intersections of pollution and water access can bring insights into the long-term effects of climate change. Such questions would ask: "What are the fears you have when using these water resources?", "What are

your doctors saying you should do when in contact with these pollutants”, and “In your experience and your family’s, what needs to change?”. When interviewing for water management, the purpose is to gain knowledge about why they continue to have strict or passive water regulations for these counties. The motivation is to understand why these regulations are negatively impacting community members and if there are discrepancies in water advocacy versus job performance. Such questions would ask: “Why do you continue to supplement poor regulations for these communities?” “How does your job impact your own decision-making when establishing these regulations”?

With our last method, we are to use focus groups in order to see which folks of San Joaquin County are majorly affected by these water regulations. Members near ravines or to community water wells may be the most impacted, so their relationships with water accessibility need to be examined. For example, the chemical 1,2,3, TCP is a fumigant found in crops that has severe carcinogenic effects if consumed. Water systems may need to spend “anywhere from \$22,668 to 473,740 per year to meet the new standard, according to State Water Board estimates” (Lohan 2017, 2). Focus groups surrounding communities unable to afford new regulations and systems are the ones needed for this research project. With a blend of economic, health, and environmental impacts, their conversations reveal much about their positions. As for those in water management, focus groups surrounding officials in charge of San Joaquin County’s water regulations are needed here. This particular focus group allows researchers to understand motivations and dilemmas if any in producing these polluted water systems.

Those who would find this useful are climate activist groups and health researchers interested in ecological health. San Joaquin County Public Health Services (SJCPHS) will find this research useful as it deals with county-level population health both at the micro and macro levels. Additionally, the San Joaquin County Health Care Services Agency will benefit in providing immediate health to the community members especially if data can be provided about environmental-health impacts. These two facilities can also greatly benefit

from the long-term environmental data that further add to discussions of climate change. This will provide credible data and the need for climate-based activism.

10. INJUSTICE ANALYSIS

Injustices Plaguing 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 their harmful effects (Cheuse, Emma, and James Pew, January 30, 2020).

Residents in the vulnerability 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 that 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 stereotypically 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 a 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 letting the soil rest to recover its nutrition and the installation of water treatment systems and performing periodical checks (Meadows, Robin, July 7, 2017).

For intergenerational injustice, the percentage of children, age 1 - 17, reported having 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 environmental organizations 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 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 the inability to find certain resources. This results in those having a 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.

For other forms of injustice, some CAFOs are given immunity when participating in the study of the effects of CAFOs on the environment, while the EPA delays the research, leaving many CAFOs releasing tons of contaminants, toxic chemicals, and pollutions to the environment. Protest and push EPA progress and spread the news through social media. This injustice can be addressed through encouraging awareness and potential danger of those pollutants, regulating restrictions and procedures on CAFOs and the amount of pollution CAFOs are allowed to release, and removing immunity from CAFOs.

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FIGURES

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