

Fresno County

COMBO DISASTER
CASE STUDY



ENVIRONMENTAL
INJUSTICE

SUMMER 2021

GROUP NO. 4

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CITE AS

Kapadia et al. 2021. Combo Disaster Case Study: Fresno. Environmental Injustice, *Disaster STS Research Network*.

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

Cover

Caption: This picture illustrates a field of dry, cracked land in Fresno. Drought has always been one of the most devastating issues in this county, and climate change is truly exacerbating the situation. The trend of extreme weathers “affect everything from local weather to where crops can grow, and have consequences that will ripple through communities today and in the coming century.” (Gray 2019). As a highly agricultural



county with little reserve of freshwater, Fresno may be one of the first regions to fall under the combo disaster impacts of climate change.



Reference: Gray, Ellen. 2019. "Earth's Freshwater Future: Extremes of Flood and Drought." NASA. June 13, 2019.

<https://climate.nasa.gov/news/2881/earths-freshwater-future-extremes-of-flood-and-drought/>

Image source (Screenshot By Pengxuan Wu):

<https://www.kmjnow.com/wp-content/uploads/sites/461/2015/05/drought-california-trailer.jpg>

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INTRODUCTION

This case study report focuses on climate change and the array of environmental hazards it creates and intersects with in Fresno County.

Climate change causes both fast and slow disasters: Climate change is linked to increasing 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. It also describes how climate change produces many intersecting injustices, which together produce environmental injustice. [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.

There are numerous efforts to combat global warming, and many of them can be categorized into efforts of climate change mitigation or efforts of climate change adaptation. Climate change mitigation addresses the roots of the problem, like reducing emission of greenhouse gases and conserving resources. “Mitigation can mean using new technologies and renewable energies, making older equipment more energy efficient, or changing management practices or consumer behavior.” Climate change adaptation refers to the adaptive responses to the impacts of climate change. These responses do not necessarily address environmental issues, but try to lower the risks and prepare the vulnerable individuals against future threats.

Despite compelling evidence and visible impacts of global warming, there exists skepticism and doubts about climate change related concepts, or “climate change denial.” Some examples include: global warming is natural/not caused by human activities; there is no actual proof; climate variability is normal; humans simply cannot predict the future, we cannot do anything about climate change at this point, etc. In Fresno county, there are still many individuals that aren’t aware of climate change: “Many residents of Fresno are desensitized to the environmental issues in their city, or they do not have the power to become involved, such as children and the elderly” (Eij Fall Group 2 2019).

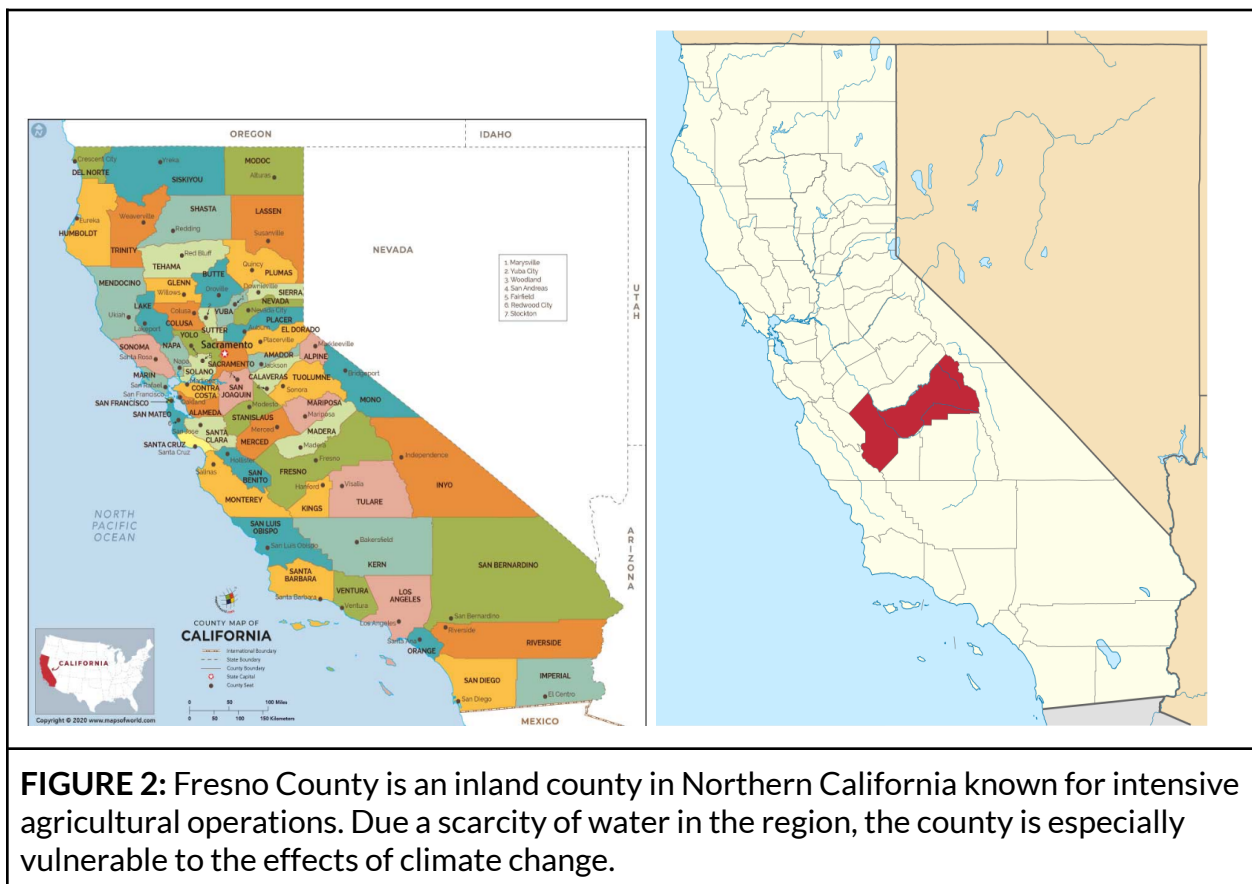
The report addresses a series of ten questions (Fig. 2) that draw out local details in a manner that encourages comparison with other places. The research has been done quickly (within the constraints of a quarter-long undergraduate class) so is limited to and points to the need for further research 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.



Source: <https://www.mapsofworld.com/usa/states/california/california-county-map.html>
https://en.wikipedia.org/wiki/Fresno_County,_California
(Screenshots by Ginghei Mao, July 13.2021)

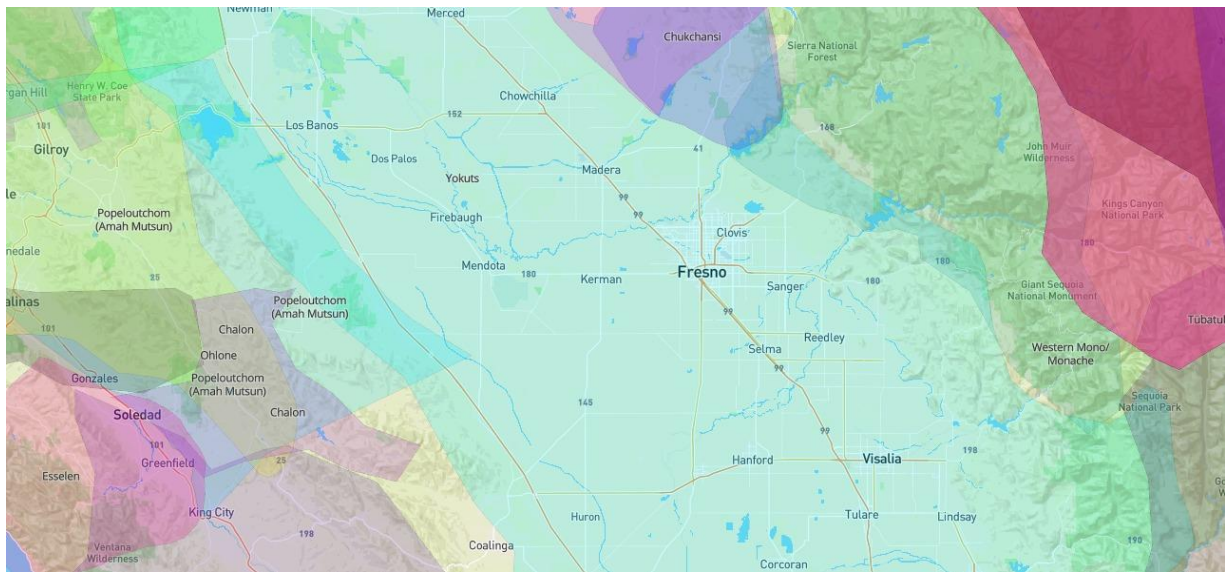


FIGURE 3: Fresno County is on Yokut and Western Mono/Monache homelands. As one of the minority groups and less represented individuals, the indigenous people face disproportionately more stress & challenges from climate change impacts and combo disasters. “Indigenous peoples are among the first to face the direct consequences of climate change, due to their dependence upon, and close relationship, with the environment and its resources.” Additionally, native people have less defense against combo disasters: “climate change exacerbates the difficulties already faced by indigenous communities including political and economic marginalization, loss of land and resources, human rights violations, discrimination and unemployment.”(UN Department of Economic and Social Affairs).

Reference: “Climate Change.” UN Department of Economic and Social Affairs. Accessed July 13, 2021.

<https://www.un.org/development/desa/indigenouspeoples/climate-change.html>

Image Source: <https://native-land.ca/>

Screenshot by Pengxuan Wu

1. COMMUNITY ASSETS & SETTING

The County that is Slowly Dying

Rayomand Kapadia

Many people in the United States when asked what Fresno County is they say it is just a bunch of rural areas with a ton of farmlands. However, that is not true as Fresno County is a vibrant county in California as you will see later on and this makes it more concerning about the combo disasters occurring due to climate change and other factors working against Fresno County. Furthermore, Fresno County has the 46th largest population by county in the United States making the situation one that needs to be known by everyone in the United States as so many people are affected. ("Fresno County - Place Explorer - Data Commons" 2019) Fresno County further is a county with a diverse background with minorities of Hispanic or Latinx origin making the majority in the county.

This does not mean that the county is a haven of equality but simply seeing the median household income shows you otherwise, being under the federal average at \$53,969. Even worse is the overall poverty level is almost double the national percent at 20.5%. (U.S. Census Bureau QuickFacts, 2021) From a sample average zip code area 93706 in Fresno

County we see the Public-School Profile showing that the test score performance of the public schools serving the area are below average. Furthermore, the percentage of students eligible for free or reduced lunch, an indicator of families living near or below poverty levels, is at 86.3%. The percentage of Public Schools with Title 1 Status, meaning the schools serve underserved populations, is at 95.0%. All this shows that the social problems in the region are very dire with the combined information telling us that the majority of the region is minorities who are near or below poverty line earners and that is affecting their children and the school system they go to. ("Zip Code 93706 Map and Profile., 2020)

However, Fresno County is not a county of only humans and rather there is vast diversity in Fresno County that is in constant threat due to the environmental problems occurring in Fresno County. Fresno County has a major Wildlife area protected by the government in the northern part of Fresno County called Mendota Wildlife Area. (Fig. 4)

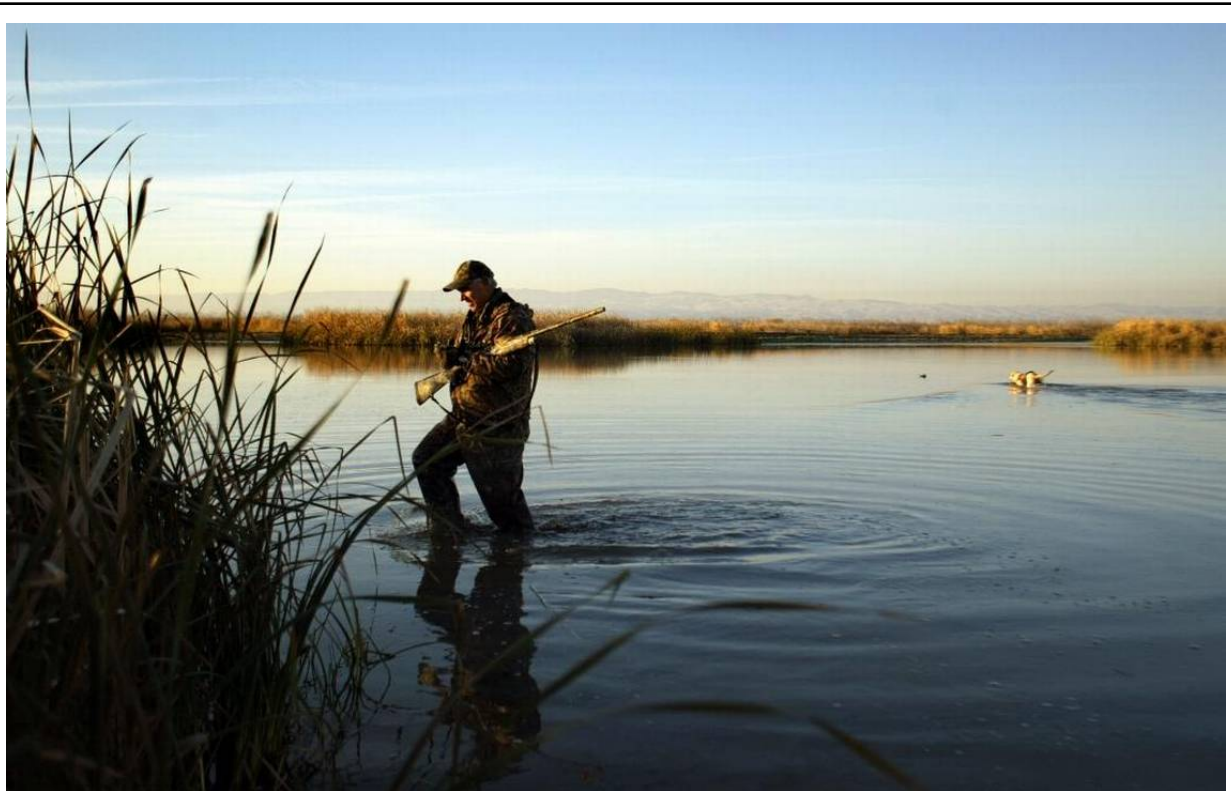


FIGURE 4: Fresno County is home to the Mendota Wildlife Area, a major government

protected area. Its delicate ecosystem is in danger however due to the constant combo disasters in Fresno County.

Source: <https://www.fresnobee.com/sports/outdoors/article37148118.html>

Screenshot by Rayomand Kapadia on 07/13/2021

This area is approximately 11,800 acres preserve consisting of flatlands and floodplains. It is home to many of the native Fresno County wildlife populations and is a very close-knit ecosystem that could severely be changed by climate change. This and many more ecosystems in Fresno County are affected by the many combo disasters that are facing Fresno County now and if things continue now, it will only worsen as time goes on. (Fig. 5) With a study showing that Fresno County affected by climate change are likely to accelerate by the end of this century include hotter and longer summers, 80% less snow caps which provide water for irrigation and normal use by Fresno County members, changes in agricultural production, etc. Furthermore, as climate change continues the crops produced today in Fresno County will no longer be viable to produce either leading to massive decline in farms and jobs or a change to a less profitable crop to farm in Fresno County. ("Climate Change Adaptation Planning in Fresno County" 2011)



FIGURE 5: Fresno County is being hit with longer and longer lengths of droughts leading to dried up wells and as a major agricultural county no water to feed crops. This is only worsened by the rising temperatures leading to worse crop yields or crops left to fallow, being uncultivated.

Source:

<https://www.rosevilletoday.com/press-releases/fresno-county-joins-coalition-seeking-california-emergency-drought-declaration/>

Screenshot by Rayomand Kapadia on 07/13/2021

Fresno County is also prone to major Wildfires with the drought that Fresno County is currently in for the past 2 years means that the dark red areas probably already are starting to die. Furthermore, it can be seen that Eastern half of Fresno County is affected more when it comes to drought consequences with hotter and drier temperatures. (The County of Fresno 2018) This according to a central California map on wildfire prone area makes Eastern Fresno County have a very high chance of wildfires. The eastern area of Fresno County in fact just had a massive wildfire named The Creek Fire which scorched 379,000 acres of land in 2020. At the time of writing this the same area affected by The Creek Fire has actually been hit with even more smaller fires. (Biswas 2021)

This brings us to the assets that Fresno County has to combat these problems. Fresno County’s biggest asset if they decide to do something substantial has to be the Fresno County government which has started some plans to decrease its counties environmental footprint and through that decrease its likelihood of getting major combo disasters. (fig. 6) The government has set up things like Cooling centers for high temperature days refuge in Fresno County but hilariously the government partnered with Pacific Gas and Electric Company (PG&E) a major polluter causing these high temperature days.

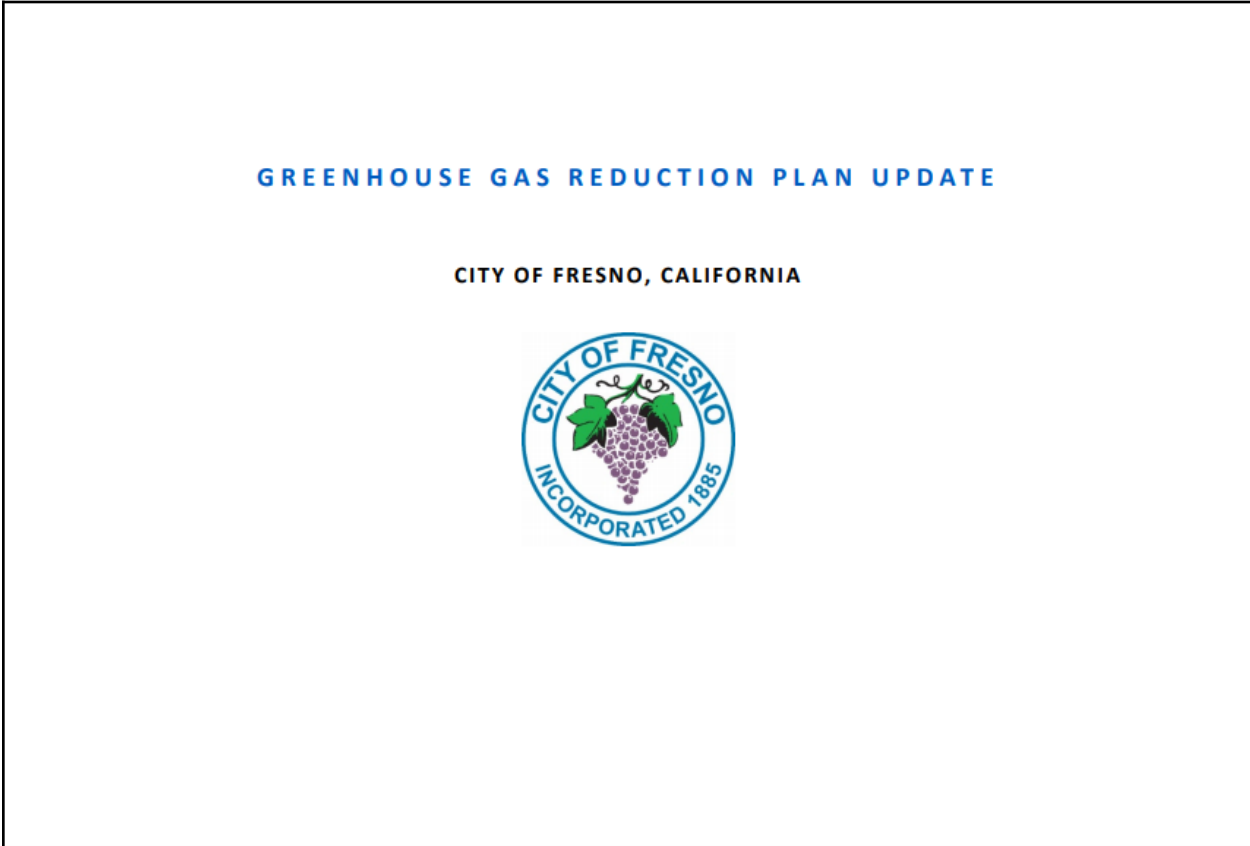


FIGURE 6: The City of Fresno adopted its first Greenhouse Gas Reduction Plan (GHG Plan) in December 2014. Since then it has committed to providing a livable, equitable, and economically vibrant community through the reduction of greenhouse gas (GHG) emissions by using energy more efficiently, harnessing renewable energy to power buildings, recycling waste, and enhancing access to sustainable transportation modes. References:

https://www.fresno.gov/darm/wp-content/uploads/sites/10/2020/03/Appendix_G-GHG_Reduction_Plan_Update.pdf

The people of Fresno County know the government has been slow and inefficient in passing programs and regulations against environmental pollutants in Fresno County and with that is why the people and non-governmental organizations in Fresno County are stepping up in droves to start to take things into their own hands and force changes for the betterment of their count. (fig. 7).



FIGURE 7: People from all walks of life take to Fresno streets on worldwide day of strikes to bring awareness for climate action. Marchers strolled past City Hall, the federal courthouse, and at Eaton Plaza, while chanting, “We walk as one, we breathe as one, we’re not going to stop ‘til the work is done.”

<https://www.fresnobee.com/news/local/article235315217.html>

(Screenshot by Martha Rayo Osuna, July 13, 2021)

The abc30 news network is the major news network for Fresno city and surrounding areas. It has the highest news broadcast time out of all Fresno news channels, Broadcasting News 39 and a half hours of locally produced news stories a week. It has also historically broadcast information relating to forest fires to help citizens avoid health hazards from the fast disaster. However, information is not spread as well enough with the Yale Climate Opinion Map showing that out of the 73% of people that think global warming is happening only 58% think that global warming is caused by human activities. (fig. 8)

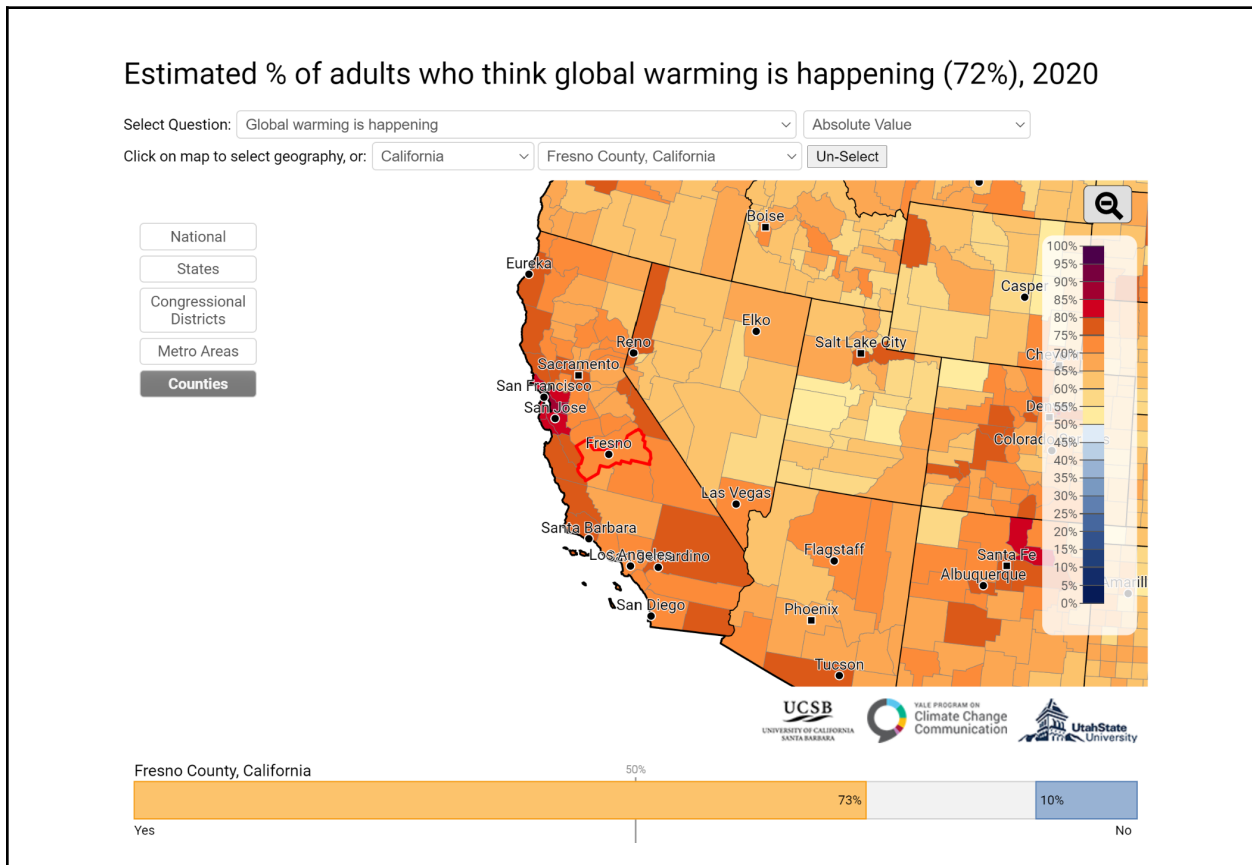


FIGURE 8: This Yale Climate Opinion Map and associated data indicates that 73% of the people in Fresno, Louisiana think that global warming is happening, but only 58% think that global warming is caused by human activities. However, it also indicates that only 40% discuss climate change at least occasionally

<https://climatecommunication.yale.edu/visualizations-data/ycom-us/> (Screenshot by Ginghei Mao, July.13 2021)

Finally, two groups in Fresno County have been trying to combat the air pollution in Fresno County and affordable health care in low-income neighborhoods. “The Central Valley Air Quality (CVAQ) Coalition leads a partnership of more than 70 organizations in the fight for clean air for the San Joaquin Valley, our nation’s most polluted air basin.” (“CVAQ Mission” n.d.) On the other hand, as it does not seem like Fresno County Unified School Board has or is going to pass any climate change related mandate for inclusion in classes to learn about climate change some schools such as Ahwahnee Middle School are taking things into their own hands and are teaching about climate change without Fresno County requiring it. (Mays 2015)

2. FAST DISASTER & OTHER ENVIRONMENTAL THREATS

Heat, Fire, and Water

Yeseong Kim

Fresno County has experienced serious environmental health threats because of climate change. According to Figure 9, Fresno County is expected to have an increased average temperature with decreased precipitation. This allows us to conclude the dangerous impact that climate change can cause to Fresno County.

While there are several factors causing climate change in Fresno County, one main factor that results in climate change is agriculture. It is said that there are 119,097 cattle in Fresno County which are responsible for greenhouse gas emissions (Fresno County Conditions). Also, ammonia production for industrial agriculture creates “1.5 percent of total global carbon dioxide emissions” which is one of the greenhouse gases that cause climate change (Lomax 2020).

Climate change can cause various types of environmental hazards in Fresno County. One main environmental threat is increased temperature due to extreme heat. Extreme heat in

Fresno County is dangerous because “Warmer temperatures will facilitate the spread of disease, worsen air quality from extended agricultural fallowing, and challenge food security in disadvantaged communities” (Regional Reports). Recently, Fresno County has experienced a major increase in temperature that resulted in over 100° F, “with Sunday forecasted to hit 112 degrees in Fresno” (Dangerous Heat Moves into Central California Thursday, Excessive Heat Warning Issued). To deal with these abnormal temperatures, there is an alert system called Excessive Heat Warning that warns people “when going outside or being indoors without air-conditioning” (Blake 2021).

Another environmental threat caused by climate change in Fresno County is Wildfires. According to Figure 11, Fresno County includes areas with extreme risks for fire hazards. Fresno County experiences several large Wildfires annually including the Creek Fire that burned over 346,000 acres in 2020 (Gabbert 2020). These Wildfires are dangerous because they destroy properties of residents in the path or the surroundings of the Wildfire and create large amounts of smoke and ashes that can damage respiratory organs. To prevent further damage from Wildfires, Fresno County has a Fire Reduction Program that removes objects that are easy to burn such as dead branches, creates barriers to use in case of firefighting, and helps harden households to protect properties of residents.

Climate change in Fresno County also results in drought. Fresno County is reported to experience extreme or exceptional drought in all areas with 36.32 percent of Fresno County experiencing exceptional drought (Fresno County Conditions). Drought is dangerous in the fact that it is related to agriculture. Because there is “less available surface water during seasonal drought when irrigation requirements are highest,” drought can cause serious impacts in agriculture such as decrease in income and food supply of residents in Fresno County (Regional Reports). California government manages drought through their own drought preparations, including “requiring local agencies to bring overdrafted groundwater basins into sustainable conditions by 2042, called the

Sustainable Groundwater Management Act (SGMA), establishing new standards for indoor, outdoor, and industrial use of water, funding solutions for disadvantaged communities lacking access to safe drinking water, increasing the frequency of water use reporting, granting the State authority to order failing public water systems to consolidate with better-run systems, tightening landscape efficiency standards for new developments, analyzing the drought risk of thousands of water suppliers and gathering from stakeholders recommendations on ways to improve drought contingency, and assessing water systems across the state that are failing or at risk of failing in a first-ever comprehensive needs assessment” (Drought Preparedness – Water Resilience Portfolio Initiative).

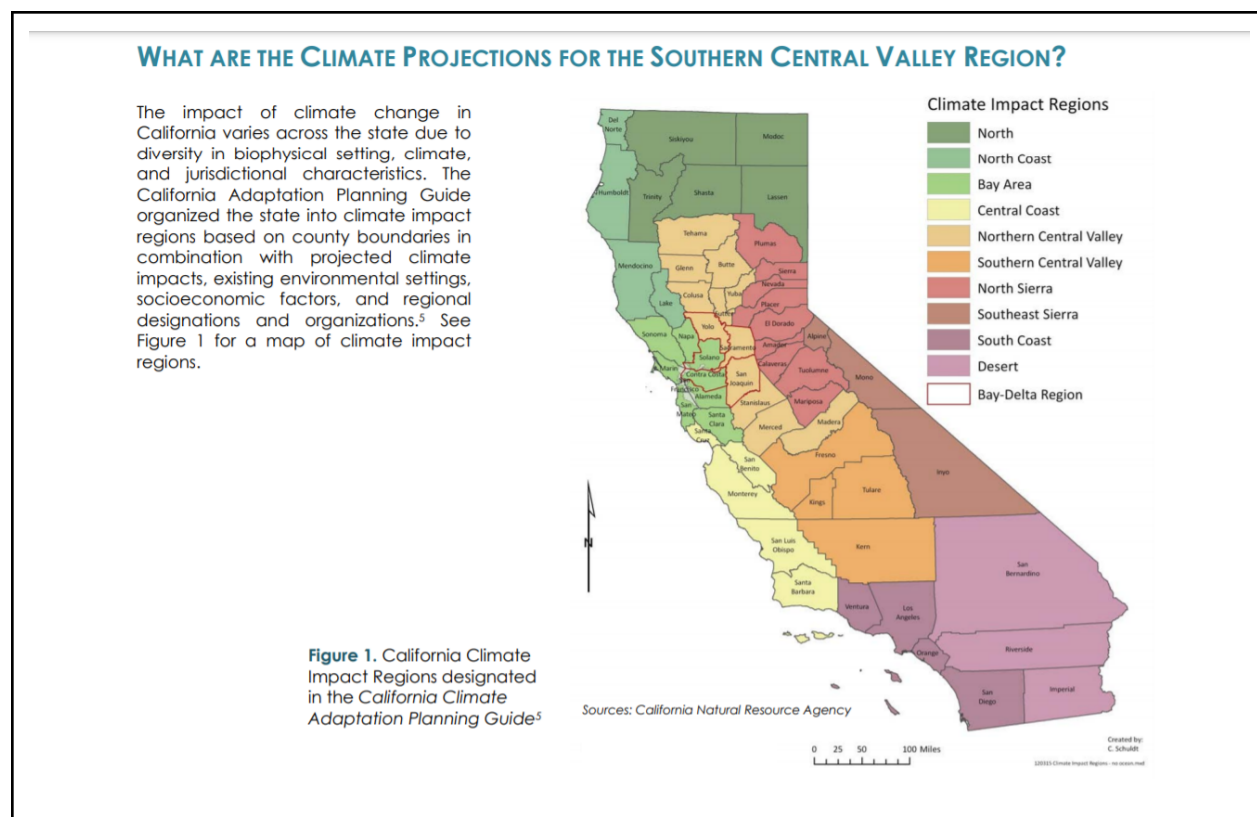


FIGURE 9:

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. Fresno County is labeled as a Southern Central Valley climate prediction meaning it is

said to expect a substantial rise in average temperature with declines in annual precipitation levels. All this means that Fresno County will no longer be suitable for agriculture the way it is now.

https://www.cdph.ca.gov/Programs/OHE/CDPH%20Document%20Library/CHPRs/CHPR019Fresno_County2-23-17.pdf

(Screenshot by Rayomand Kapadia on 07/13/2021)

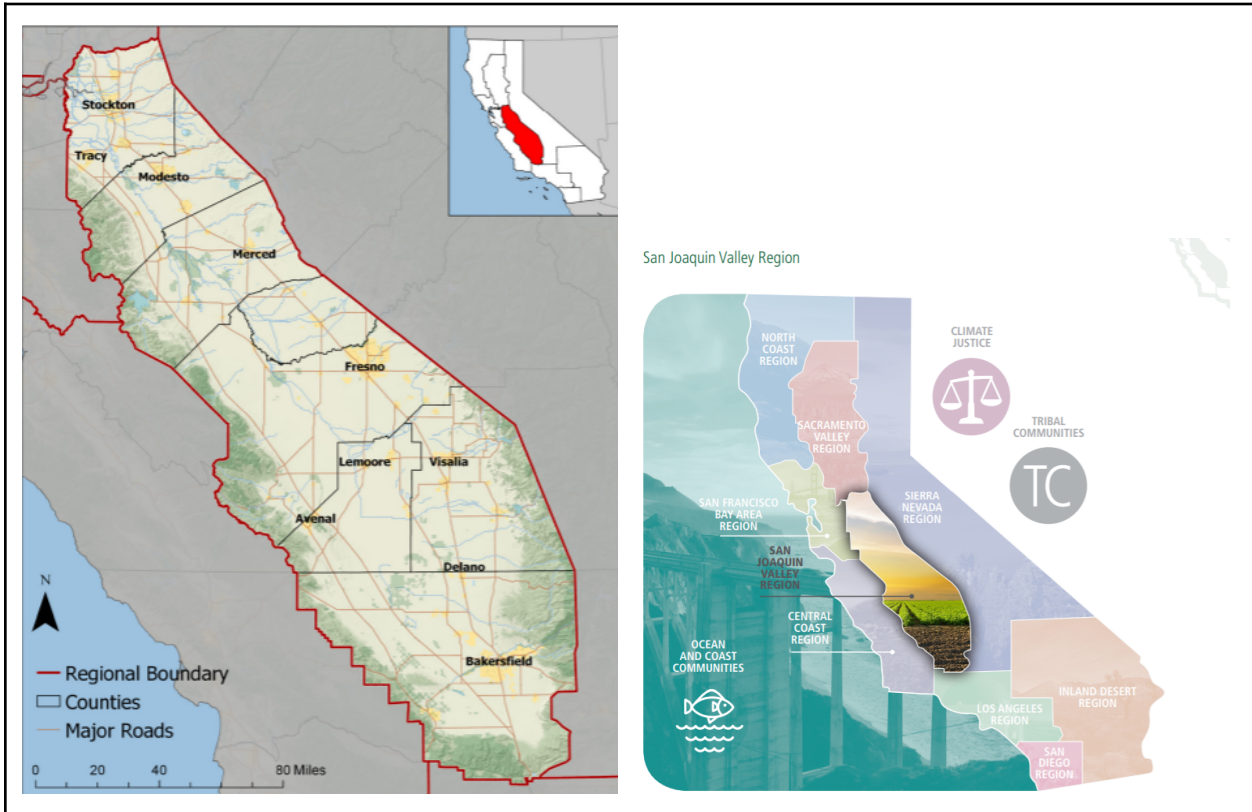


FIGURE 10:

Caption: These maps show how California regions were divided up for study in California’s Fourth Climate Change Assessment. The San Joaquin Valley region includes San Joaquin, Stanislaus, Merced, Kings, and Tulare County and part of Madera, Fresno and, Kern counties (Hall 2018).

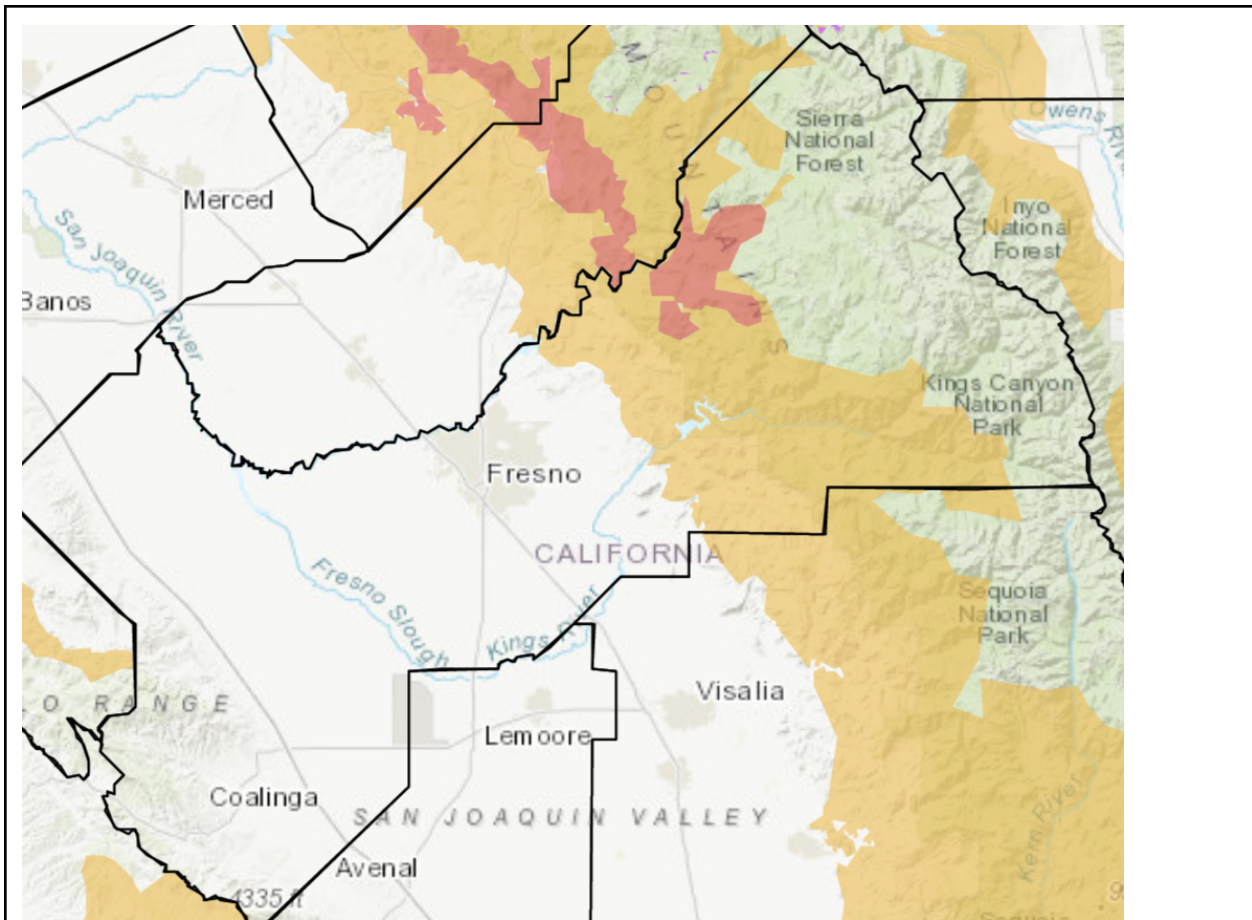


FIGURE 11:

This map shows that eastern parts of Fresno County (in yellow) are at elevated risks for wildfires. Like many counties in California, Fresno has some at least some areas (in red) with extreme risk for fire hazards.

<https://ia.cpuc.ca.gov/firemap/>
(Screenshot by Ginghei Mao, July.10 2021)

3. COMPOUND VULNERABILITIES

What's Worsening the Impacts?

Shaoheng Zhang, Pengxuan W

Climate change is a global phenomenon that also has serious local impacts. These effects, in turn, will affect agriculture, human health, infrastructure, forestry, emergency response, tourism, and many other aspects of the community. The impact of climate change is expected to exacerbate existing problems, while also bringing new problems. The severity of climate change impacts directly correlate with the communities' defense and response against the disasters. It is evident that a vulnerable community with weak political power, lacks economic opportunities, and with poor health care systems would suffer more from combo disasters and have less chance to recover from each devastation.

Fresno county has multiple compounding vulnerabilities that weakens its defense & adaptation against climate change. According to Figure 12, the poverty rate in Fresno county is about 17.7%, which is below the state average. Those in poverty often lack the resources to be prepared and/or quickly respond to disasters. For example, costs to relocate their houses against floods or wildfires, repairs for property damage during extreme weather, and increasing costs of supplies due to land loss. "Since climate change affects everything from where a person can live to their access to health care, millions of people could be plunged further into poverty as environmental conditions worsen"

(McCarthy 2020). Additionally, with a weaker economy, it is less likely for the community to address climate change issues, especially when addressing such issues involves economic decisions. It would be really difficult for Fresno county to balance between its agricultural development and environmental regulations to reduce farm emissions.

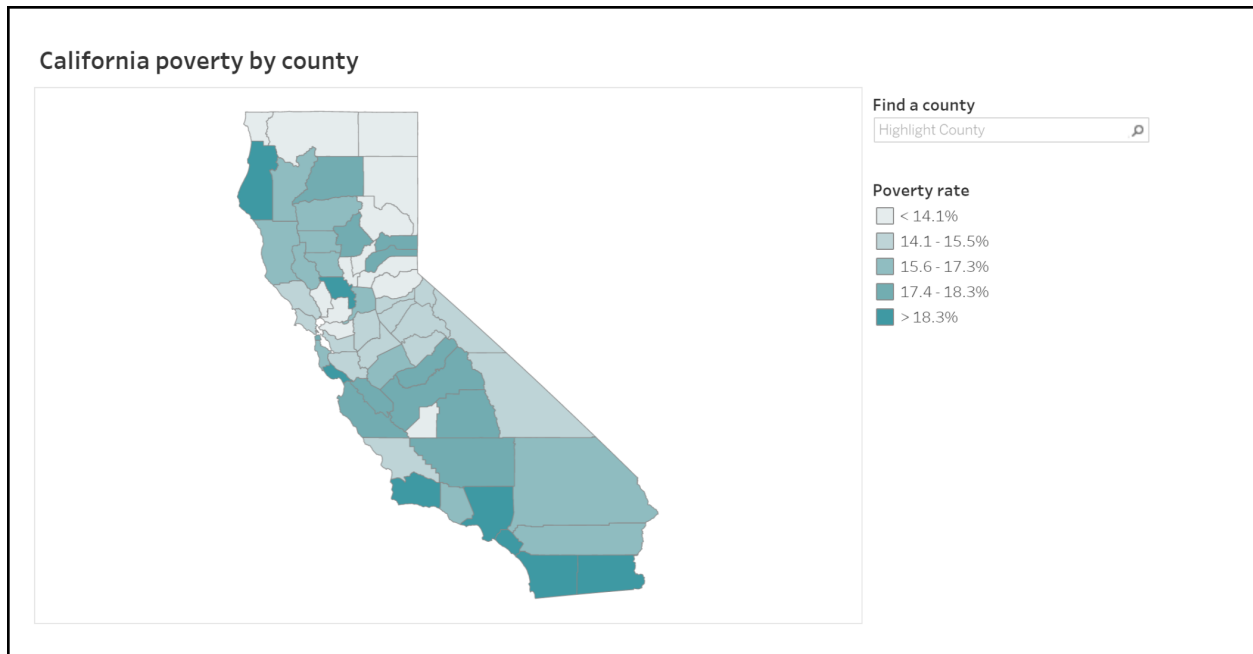


FIGURE 12:

The poverty rate in Fresno county is about 17.7%. Those in poverty often lack the resources to be prepared and/or quickly respond to disasters, almost a fifth of Fresno residents would be especially vulnerable in a disaster scenario.

<https://www.ppic.org/interactive/california-poverty-by-county-and-legislative-district/> (Screenshot by Ginghei Mao, July.13 2021).

If climate change trends continue, scientists and meteorologists predict a 1.5 Celsius degree increase in global temperature in the near future. “At 1.5 degrees Celsius warming, about 14 percent of Earth’s population will be exposed to severe heat waves at least once every five years, while at 2 degrees warming that number jumps to 37 percent.” (“A Degree of Concern” 2020). During recent hot seasons, many CA counties have experienced multiple record-breaking heat waves, but Fresno may not be well prepared for such extreme weather. According to Figure 13, Fresno performs poorly in heat sensitivity, meaning that heat waves may pose dangerous consequences to its communities.

Combining the information from Figures 14 and 15, it is evident that Fresno is also under-prepared for climate change adaptations. The residents will be more likely to face water shortages and less likely to find natural cooling shelters.

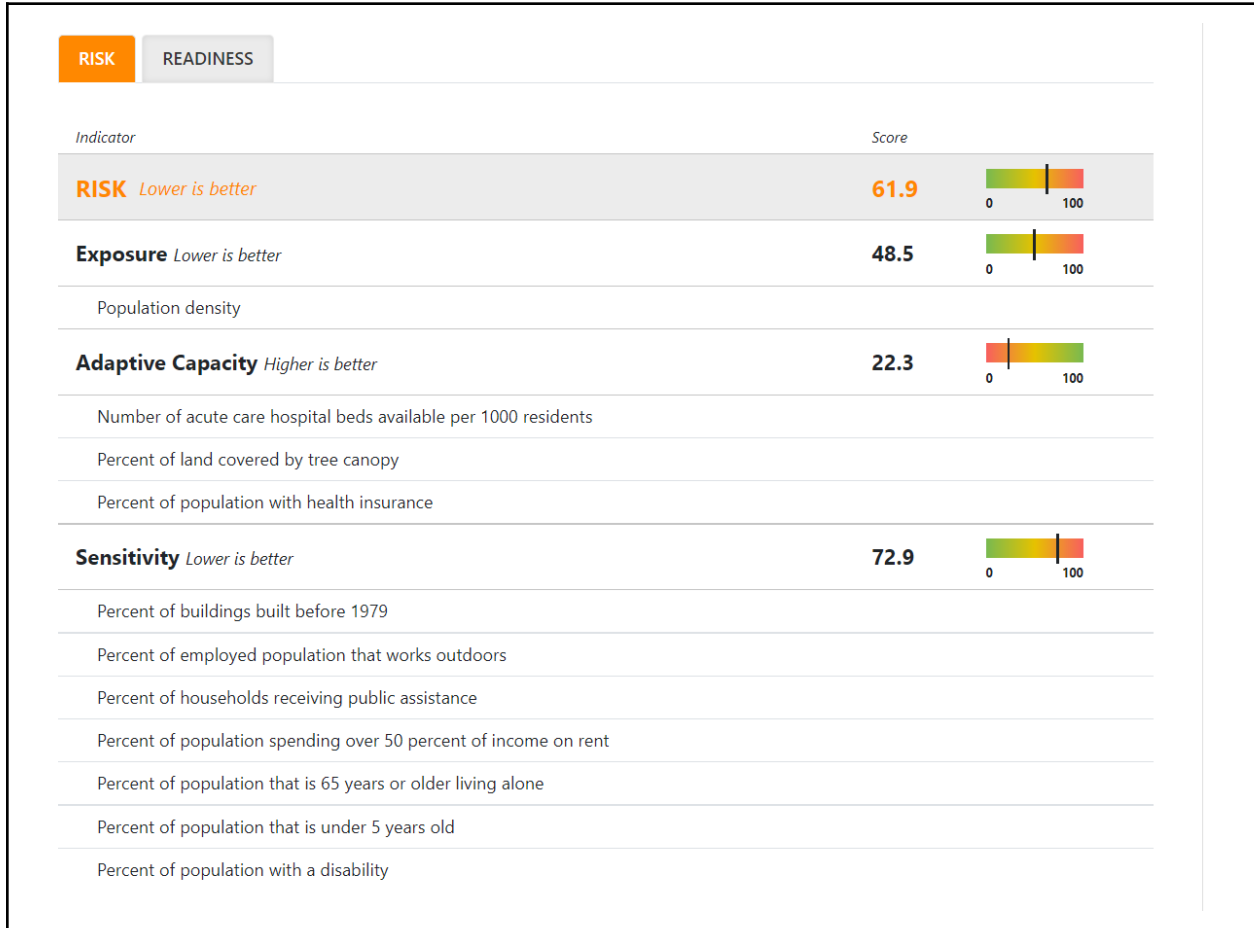


FIGURE 13:

Caption: This figure illustrates the heat risks in Fresno city. From the three heat indicators, Fresno is performing poorly in the Sensitivity score, suggesting that Fresno will be impacted heavily during extreme-heat seasons (Many residents are vulnerable, like children & elderly. Many workers have to work outdoors, and many buildings won't have proper cooling facilities since they were built before 1979).

Image Source: https://gain-uaa.nd.edu/1600000US0627000/city_profile/
 Screenshot by Pengxuan Wu



FIGURE 14:

The thousands of wells that are the source of water in the San Joaquin Valley are at risk of drying up. This leaves families in Fresno County without running water and are vulnerable to the conditions brought upon by the drought.

Source: <https://www.fresnobee.com/fresnoland/article250842574.html>

(Screenshot by Nishtha Mistry 13 July 2021)

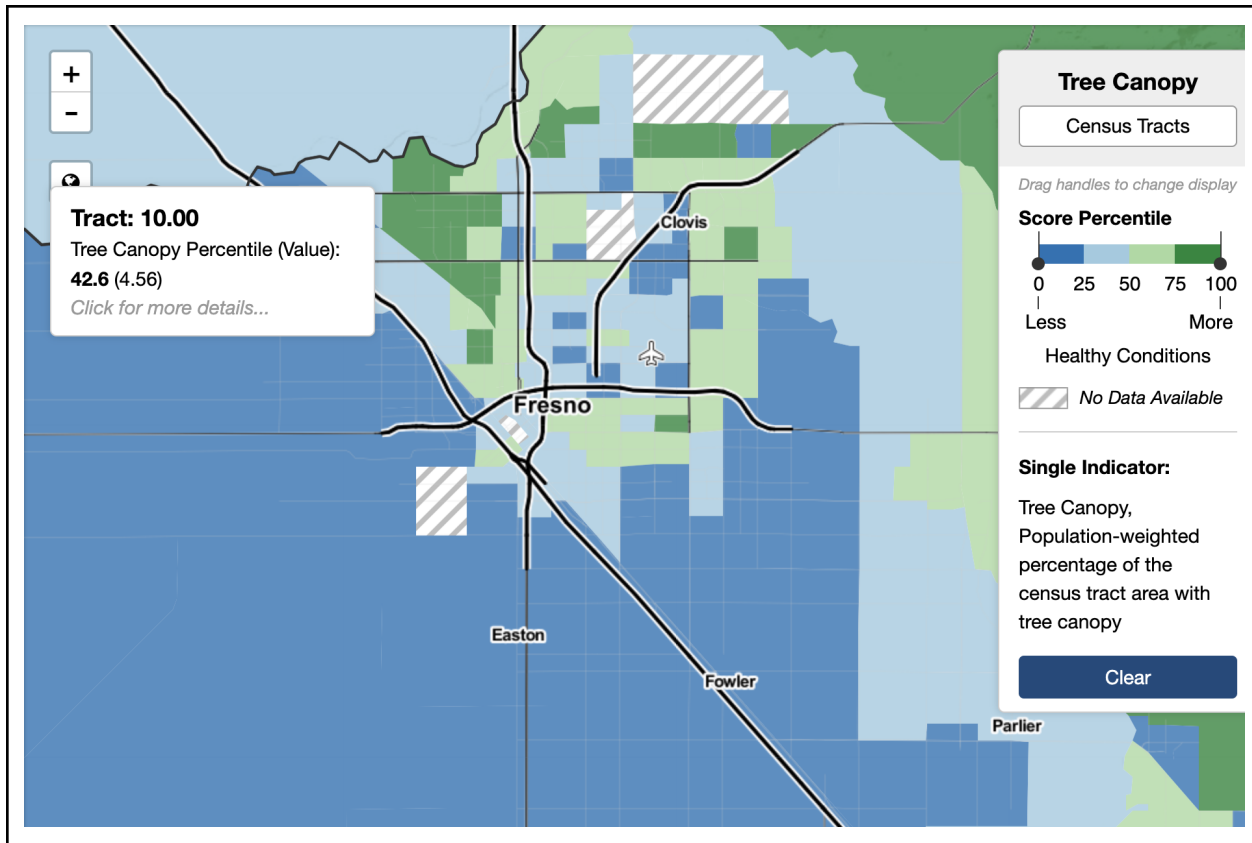


FIGURE 15:

In maps provided by the California Health Places Index, Fresno County is shown to have uneven distribution of tree canopy, with some regions of the county in the lowest percentile for census tracts in California. Trees have many health benefits, including cooling, which is especially important during extreme heat effects associated with climate change (Ulmera et al 2016).

Sources:

Ulmera, J. et al. "Multiple health benefits of urban tree canopy: The mounting evidence for a green prescription," Health and Place. Volume 42, November 2016, Pages 54-62. <https://www.sciencedirect.com/science/article/abs/pii/S1353829216301332#ab0010>

<https://map.healthyplacesindex.org/>
(Screenshot by Jimmy Duong)

Figure 7. Profile of Health Outcomes and Inequities, Social Vulnerabilities and Climate Risks, Fresno County



Social Vulnerabilities

	<u>Number</u>	<u>Rate or Percent</u>
Living in rural areas	100,537	11%
Children aged 0-4 years	78,980	8%
Adults aged 65 years and older	93,421	10%
Linguistically isolated households	29,169	10%
Adults educated less than high school	142,397	27%
Poverty rate, total	204,487	23%
Households rent/mortgage ≥50% of income	57,845	20%
Outdoor workers	45,737	12%
Households that do not own a car	25,681	9%
Food insecurity among low-income households	146,000	46%
Violent crimes per 1,000	4,976	5
Voted in 2010 general election	198,415	51%
Nursing facilities, prisons, college dorms	17,523	2%
Households with air conditioning	268,066	94%
Census tract average area with tree canopy	5%	

Climate Risks

Population in a high-risk wildland fire area, 2010	17,837	2%
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FIGURE 16:

A 2017 report by the California Department of Public Health says that all Californians face increasing risk from extreme heat. In Fresno County (2009 data), 94% of households have air conditioning, which shows that the climate is hot enough for a majority of households to have it.

Source: California Department of Public Health. 2017. "Fresno County Climate Change and Health Profile Report. State of California. (Screenshot by Jimmy Duong)

4. STAKEHOLDER ANALYSIS

What's at stake?

Martha Rayo Osuna

Individuals, people, and organizations with a stake in a problem or project are referred to as stakeholders. They are any group that is implicated in the issue or initiative, who hold different stakes whose outcomes can affect them in a multitude of ways. For example, within a community there are workers, residents, and companies that hold stakes in local issues. Alternatively, there are representatives, administrations, and governments that can be identified as non-local stakeholders. They can also be both internal or external. These are just a few examples of stakeholders, as there are a great deal. To name a few, there are researchers for the Environmental Health Public Health Journal, the American Lung association, major oil and gas corporations, and racial and ethnic minority citizens in Fresno.

Their perceptions for some of the issues in Fresno include a lack of recognition and environmental justice for the peoples livelihoods as a result of living in these highly polluted areas. This is exemplified through environmental injustice that is cumulative and creates a combination of factors that intersect with economic, reproductive, racial, and health injustices that occur in Fresno county. For example, Fresno's birth rates

significantly contribute to the livelihood of its community. Currently, there is research that has discovered there is a high number of preterm births that is correlated with low socioeconomic status, “In Fresno County, we found multiple pollution exposures associated with increased risk for preterm birth, with higher associations among the most disadvantaged” (Padula et al. 2018). Stakeholders directly impacted by this data include not only currently pregnant women, but also families, and anyone in the area who would one day hope to start a family of their own. In addition, people affected by these findings are generally unable to take actions against these issues as they are usually lower-income people and cannot afford better healthcare or to move away from the area.

Another stakeholder is the American Lung Association, who came out with a State of the Air report which concluded, “The report looked at data from official federal, state and local monitoring sites from 2017, 2018 and 2019 – the most recent quality-assured data available. Along with the ranking, the report assigned grades for the three categories of pollution. Fresno failed each.” (Tehee,2021). Political and health factors contribute to the environmental health vulnerability and injustice in this setting because, according to Tehee, the district continues to work with residents, agriculture, and other industries to reduce residential wood burning emissions and emissions from mobile sources. But it also fails to take into account that it is the oil and gas corporations that are mostly responsible for all the carbon emissions and pollution in the county. Additionally, the report fails to mention that carbon emissions and pollution are known to cause respiratory problems for the community members living in those areas.

Finally, one of the most vulnerable stakeholders in the Fresno community are its racial and ethnic minorities. Since the COVID-19 pandemic, public health professionals have recognized a correlation between poverty and health, “Over the past year, disadvantaged rural and urban neighborhoods – often areas with larger proportions of racial or ethnic minorities including Black, Latino, Hmong and immigrant populations – have been disproportionately affected by the coronavirus pandemic” (Sheehan,2021). The pandemic

has magnified the racial health disparities in Fresno. Those who are lower income may not be able to afford to get tested, treated, or have access to transportation to medical care if needed. This impacts the most vulnerable members of the community, as they may not be able to receive the care they need to survive amidst a crisis. Further data is needed on racial health disparities in lower income areas. These are just a few examples of those who are most affected by these environmental injustices that require more recognition and solutions because people's lives and wellbeing are at stake.

5. STAKEHOLDER ACTIONS

Good Rules Without Enforcement

Veena Naveen

Stakeholders in Fresno include the residents, Almond Farmers, the Almond Board of California, the community organizations, the California Environmental Protection Agency, the Natural Resources Defense Council, and a team of researchers who studied the long-term effects of pollution in Fresno.

The California Environmental Protection Agency (EPA) released maps in 2014 that showed Fresno to be the county most affected by pollution. Specifically, “eight of the state’s 10 census tracts most heavily burdened by pollution are in Fresno” (Marcum).

During this time, there was widespread organized opposition to the Darling International meat rendering plant, which was responsible for pollution that caused environmental and health Hazards in Fresno. The California EPA released data showing that the Cargill plant, which is at the intersection of two freeways, was in fact causing more pollution than Darling (Marcum). However, they did not take any specific measures to raise awareness about the greater threat posed by Cargill than by Darling. As a result, there was no community-led organized opposition to the Cargill plant as there had been for the Darling plant. In 2018, a researcher affiliated with the California EPA collaborated with researchers from the University of California in San Diego, the University of California in San Francisco, and the Office of Environmental Health Hazard Assessment to publish a paper titled "Environmental pollution and social factors as contributors to preterm birth in Fresno County", which elucidated the associations between various environmental exposures and social factors in the context of how they influence the chances of preterm births in Fresno. However, this research was not made publicly available and the paper did not suggest specific measures to address pollution and environmental injustice in Fresno (Manuela).

In 2002, the National Resources Defense Council published a report explaining the effects of pollutants such as nitrates and pesticides on the quality of the water supply in Fresno. It was found that the quality of tap water in Fresno was the worst out of all the cities surveyed (Fresno, Los Angeles, San Diego, and San Francisco). The report also made suggestions for improving and protecting the water supply but did not comment on how these measures could be implemented (NRDC).

In 2018, community organizations in Fresno including the Kern-Kaweah chapter of the Sierra Club, the Central Valley Air Quality Coalition, and Faith in the Valley sent an open letter to the Almond Board of California regarding their concerns regarding the practice of open burning of almond orchards, which resulted in smoke and ash falling on homes. The practice had been outlawed in 2003 but the observations made in this letter suggest that this law was not followed by all Almond farmers in the region. However, almond

farmers had in the past adopted the more environment-friendly practice of Whole Orchard Recycling (WOR). Research into WOR was also supported by the Almond Board. However, they did not provide incentives to farmers to adopt the practice or do enough to enforce the law against open burning (Community Alliance).

6. ROLE OF MEDIA AND BIG ENVIRONMENTAL ORGANIZATIONS

Climate Change Changers

Pengxuan Wu

Global warming affects every living being on the planet, and the solution to climate change will never be the responsibility of just one group, one organization, or one government, but the collective efforts of everyone. Many of the leading environmental agencies and organizations had taken the initiative to report & address climate change and its related consequences. Some of them had also focused on climate change mitigation and adaptation in Fresno county specifically.

The Los Angeles Times, one of the largest newspaper circulations in the United States, has made multiple reports regarding Fresno and San Joaquin Valley's climate change disasters & impacts. The article, "Solar Panels on California's Canals Could Save Water and Help Fight Climate Change," talked about a climate change mitigation effort in the agricultural counties(Fresno, Kern) in CA: using solar panels to power the water canal systems. As one of the agricultural counties that has to deal with frequent drought, Fresno's water canals are essential to its economic stability, but the energy costs to transport water are huge and usually unsustainable. With solar panel-powered water canal systems, Fresno can

expect “75% climate-friendly power by 2030 in the 700-mile system of aqueducts, reservoirs, and pumping plants”(Roth 2021). In another article, “Essential California: ‘No patience’ for climate denial,” LA Times discussed the multiple wildfires & droughts in CA and how the state governor emphasized the worsening climate change impacts. Additionally, this article made it clear that viewpoints of climate change denial are unreasonable and counterintuitive: “You may not believe it (climate change) intellectually,” the governor continued, raising a finger to his temple. “But your own eyes, your own experiences, tell a different story.” Indeed, with fires and drought in Fresno and the Central Valley being more frequent and severe, the need to address the impacts of climate change is non-negligible and non-negotiable. “California experienced a spree of fires ... experts say these kinds of wildfires will also become very normal and routine if we do not take significant action to adapt to climate change and reduce greenhouse-gas emissions”(Romero 2020).

One environmental organization, The Climate Reality Project(CRP), has also recognized the combo disasters of fires, drought, and water shortages in many CA counties. In the article, “THIS IS THE NEW NORMAL: CALIFORNIA AND CONSTANT FIRE,” CRP noted how wildfires can cause catastrophic disruptions in communities: evacuations, burned down buildings, halting public facilities (schools, hospitals), power & water outages, destruction of valuable forests & natural resources. Also, CRP 2019 stated that “thanks to this unholy combination of rising heat, longer droughts, and powerful winds, record-breaking wildfires are becoming the terrifying new normal in California.” In the near future, dry counties like Fresno will definitely face more climate change challenges and combo disasters. Another big environmental organization, Environmental Working Group (EWG), addressed the issue of climate change denial across California and other states: “oil industry giants like ExxonMobil and the Koch are waging a state-by-state, multimillion-dollar battle to squelch utilities’ plans to build charging stations for electric vehicles.” Greenhouse gases from vehicle emissions are one of the key factors for climate change, and it would be more difficult to combat combo disasters if the oil industry spread

its climate change denial viewpoints.

Wikipedia, one of the most accessible sources of information, touched upon the environmental issues in Fresno. The environmental problems that were mentioned in the article were the contamination of groundwater by pesticides and other chemical run-offs. The problems of air quality are also mentioned in relation to the surrounding mountains in the valley that trap emissions. However, no further discussions about climate change in Fresno were identified on the Wikipedia Talk page.

7. RECOMMENDED LOCAL ACTIONS

Bridging the gap between the local government, corporations and the individual

Author Name: Cristian Handaric

In a recent report by the United States Environmental Protection Agency (EPA), Fresno County has some of the nation's worst air quality, "failing to meet federal health standards for both ozone and particulate pollution."(epa.gov). While the topography of the valley can be blamed for trapping air pollutants in the valley due to the surrounding mountain ranges, the responsibility should be carried by big industries and local corporations that contribute largely to the air, soil and water pollution in the area.

One action that should be implemented at the local level is an accountability system between the local government and the big corporations. As part of this system, the local government should require local corporations to provide annual reports on the emission levels, chemicals used, and also a description of the process of storing and transporting the waste produced. While the responsibility for reducing pollution should be carried by each individual living in Fresno, in comparison to the waste produced or pollutants used and released in the atmosphere by the individual, big industries have a greater impact on the environment. Since agriculture is one of the main industries in Fresno, the use of chemical fertilizers, together with the emissions released into the atmosphere as a byproduct of using large machinery to collect and process the crops, impact the local

environment, polluting the soil, air, and water. This is concerning especially since the American Lung Society warns that increased levels of ozone(smog) “ increases the risk of premature death.” (lung.org)

An additional action that has been implemented in an effort to combat air pollution by The San Joaquin Valley Air Pollution Control District (SJVAPCD), is the use of the Pollutant Standard Index (PSI) to report air pollution information to the public, as well as to monitor compliance with the Clean Air Act”(municode.com). While it is vital for the local leadership to have access to the information regarding pollutants used by industries, it is equally important for the local government to make this information easily accessible to the public. This would not only make the public aware of the ways these corporations impact their environment, but additionally it educates them regarding the threats they and their families are being exposed to.

As illustrated in Fig.17, another action taken at the local level is the Greenhouse Gas Reduction Plan. This plan is intended to address the issue of energy usage in more efficient ways by harnessing renewable energy to power buildings, recycle waste and enhance access to sustainable transportation modes. This will lead to the City enhancing its economy, creation of jobs and improvement in the community’s quality of life.

Additionally, the City of Fresno is actively creating strategies to purchase fuel efficient low emission vehicles and technologies in a cost-effective manner, while the Advisory Committee will develop strategies that include funding opportunities to educate the private sector to convert their fleet to lower emission vehicles.

Greenhouse Gas Reduction Plan - Fresno County
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Figure ES-1: City of Fresno GHG Emissions Inventory, Forecast, and Targets

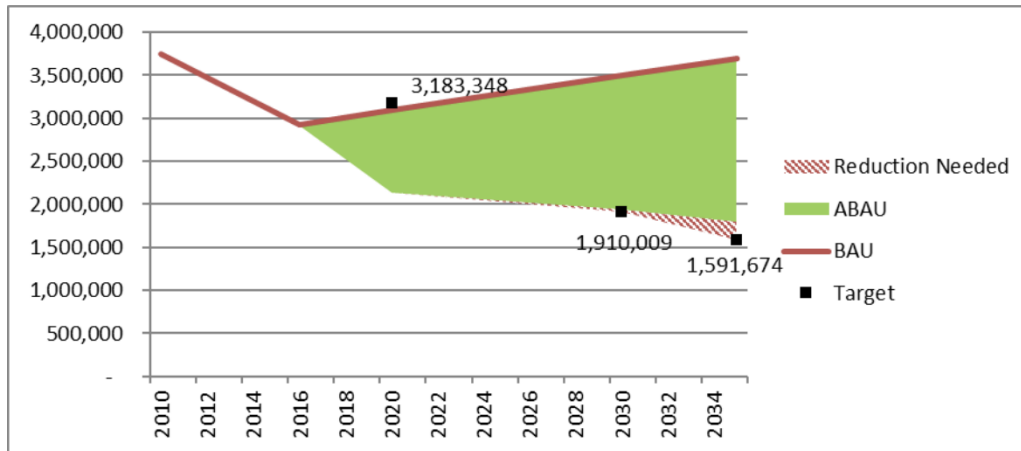


FIGURE 17: Fresno City adapted this reduction plan in December 2014. Their plan is to use energy more efficiently by harnessing renewable energy to power buildings, recycle waste and enhance access to sustainable transportation modes. This will lead to the City enhancing its economy, creation of jobs and improvement in the community’s quality of life.

Source:

https://www.fresno.gov/darm/wp-content/uploads/sites/10/2020/03/Appendix_G-GHG_Reduction_Plan_Update.pdf

(Screenshot by Nishtha Mistry 13 July 2021)

While these strategies are necessary, it is important to create programs that address the population directly. One way of reaching the community is by educating future generations regarding environmental inequalities and ways to address them. One such organization is the CCEJN which educated low income communities regarding their environment threats. On their website we can read the organisation’s mission: “CCEJN’s mission is to empower our communities and secure our children’s future by eliminating negative environmental impacts in low income and communities of color in the Central Valley”(ccejn.org). Such programs and organizations should be encouraged and advertised more frequently, since they have the potential to empower the next generation, and equip

it with the necessary means and information to combat future environmental injustices. Activism projects as the art piece illustrated in Fig. 18 can have an immediate impact on the community as well, making the public aware of the long term effects the local environmental injustices have.



“If All Trees Burn, This is All we Will See”

FIGURE 18: The activism project in Fresno County will look similar to this “Graft” Tree sculpture but more ugly and with a caption stating, “If All Trees Burn, This is All we Will See”.

Source:

<http://www.artsobserver.com/2012/01/01/graft-tree-by-roxy-paine-ringing-in-2012-with-symbol-of-life-growth-order-and-chaos/>

Screenshot by: Rayomand Kapadia on 07/14/2021

8. RECOMMENDED EXTRA-LOCAL ACTIONS

Wide scale changes for a new beginning in Fresno County

Nishtha Mistry

Fresno County's high pollution levels in air and water has targeted the low-income population in the west region, leaving them subject to intergenerational health disparities. The vast number of industrial facilities in the area disproportionately impact minorities in the area and the community continues to be silenced by the local, state, and national government. Since these facilities are being built in vulnerable areas with little to no opposition, there is a source of income coming from the plants that authoritative figures do not want to eliminate, even if it means risking the health of the people they promise to protect. In addition to this constant air pollution, Fresno County is experiencing a drought due to thousands of wells drying up in the San Joaquin Valley. This has left families in Fresno County without any running water, causing them to be vulnerable to the

conditions brought upon by the drought (Vaughan).

By temporarily allocating water from less affected areas to Fresno County, the residents of Fresno County won't be as impacted by the dry conditions. Although the cost of wells is rising, having this temporary solution will prevent the residents of Fresno County from suffering even more on top of the air pollution they already experience.

One statewide step to help reduce the high levels of pollution the county already suffers through would be decarbonizing transportation. By reducing the effects of carbon emissions, the county would be able to take a step towards cleaner air. The ninth edition of the CGII was released and goes over the idea that decarbonization of energy will be both possible and profitable if transportation is included in the process. By reducing its emissions, California has started to expand its economy. Even through the global recession, California's GDP per capita has grown by nearly \$5,000 per person and emissions per capita has dropped 12 percent (Roberts).

Another key factor for eliminating pollution in the area is to increase regulations on the industrial facilities in the area. Residents of homes in regions close to these factory plants suffer from everyday pollution, making westside Fresno one of the most heavily polluted zip codes in the state of California. These facilities continue to violate hazardous waste regulations without intervention from government authorities. These actions should not go unnoticed by officials responsible for these situations and the health of the community should be at the forefront in comparison to income.

By ordering clean ups in the area from a national level, there is potential to reduce the health effects of waste disposal in the area. Similar to increasing and enforcing regulations for industrial facilities in the area, illegal trash dumps on the westside of Fresno should also be eliminated since it has left residents at risk of health deficits due to the constant exposure to the foul odor. By working to clean up the area from the constant sources of

pollution, the residents of Fresno can be alleviated from the generational discrimination they face and focus on improving their community and involvement in local politics. This will allow them to make change at higher levels and help other communities facing similar situations to have representation in government decisions being made.

9. RECOMMENDATIONS FOR FUTURE RESEARCH

Climate is Changed by Us

Jimmy Duong

Climate change is an issue that takes in a lot of different factors, such as pollution, environmental disasters, and man-made disasters. Fresno has consistently been ranked among the top 10 most polluted cities in California for a number of years (“Fresno Air Quality Index (AQI) and California Air Pollution: AirVisual) This pollution is created through various different means such as industrial facilities pumping out particulates and gases, natural disasters such as wildfires, vehicle emissions, and the agriculture sector. Jim Aldredge, a former city manager in West Fresno, stated that “pollution data is the farthest thing from your mind when you’re looking for your next meal”(Marcum). From this quote, we can interpret that the data regarding pollution is ignored since people are more worried about surviving rather than the pollution going on. The industrial facility owners within the area are prioritizing making a profit rather than reducing the amount of pollution that they pump out. Since this is what is being said regarding the data and research addressing this environmental threat in Fresno County, it would be best to address the lack of research and effort by part of the county. In order to better understand the pollution within this area, we must conduct more research.

First and foremost, some pollution research we must find regarding Fresno county is all the possible factors that pollution is contributing to climate change. We need to figure out which natural disasters are contributing to pollution.

Secondly, Fresno county could benefit from finding out how the natural disasters such as climate change, extreme heat, drought, etc affect the well being of individuals. We must figure out how these also affect the mental health of those residents as well as physically.

Lastly, there needs to be more surveys in order to hear the opinions of the residents, only then we will know where their mental state lies. From this list of information that we need to collect, we have designed a qualitative study in order to find the answers.

The research question we must ask is: how does the Latinx community within Fresno county perceive the current climate changes in their area if they believe there to be any? From this question alone, we have narrowed down the social groups that we will interact with to the Latinx community, since they make up the majority of Fresno County at 53.5% of the population. In order to gain access to the Latinx community, we will put up flyers asking Latinx residents to call in and voluntarily answer our anonymous survey. We will also have field analysts roaming the area asking residents if they would like to participate in the survey. The participants will remain anonymous in order to protect their identity. We can use survey responses in order to get the data we need to make a claim regarding the health and psychological effects the changes in climate has had on them. We will ask the participants the following questions: Do you believe that climate change is a prevalent issue in your area? Have you noticed any changes in health or mental state if you believe climate change to have occurred? Are there any concerns that you have regarding climate change in this county? Policymakers in the county will find this research useful since they will be able to hear the opinions of their residents and act accordingly to meet the needs of those residents.

10. INJUSTICE ANALYSIS

The Greatest Crime Against Humanity

Ginghei Mao

The ecological destruction of planets and subsequent migration of civilizations is a popular trope in science fiction. For us who live with the constraints of reality, taking care of our own planet comes several steps before space travel -- the technology required to regulate and maintain large environments is a prerequisite to surviving in space. However, we've been struggling to take that step. Our planet has been on track to meet an irreversal doomsday, and we're the conductors; human driven climate change is about to wipe humanity off the face of the earth. But even in this largest-possible-scale disaster that every member of our species will have to stare down, the conspiring between epistemic, infrastructure, and economic injustices mean that climate change is hitting the traditionally vulnerable harder.

In the early 1900s, scientists already had an understanding of how certain greenhouse gases interact with heat in the atmosphere and theorized that human activities were causing the planet to warm. By the 1970s, the idea of large-scale human-caused climate change was accepted by nearly all scientists and a vast majority of laymen. In order to maintain their business model, Exxon launched a campaign to diminish the trust the public had in scientists (Upin). Their efforts, which included slandering their own researchers, were successful. The 1970s saw the kick off of the largest environmental movement in history; the EPA, NOAA, and earth day were established, mandates to clean the air and water were passed, countless harmful chemicals were banned from industrial use. The

world was aware of their interaction with the planet. Now, 50 years later, the existence of climate change is a topic of political debate in the US.

The simplest way to combat the effects of climate change is through improvements in infrastructure, but the collaboration between infrastructure and economic injustices mean that those who need relief the most have the least power to obtain it. According to the nonprofit conversation group American Forests, low income neighborhoods and communities of color tend to have fewer trees (Montalvo). In general, the presence of trees helps mitigate the effects of increasing temperature since they absorb large amounts of sunlight, and cast shade on asphalt which retains and releases large amounts of heat. However, even if more trees were to be planted in the poorer regions of Fresno, the community would be unable to maintain the plants. The water canals in the county are in poor condition, meaning that there is a bottleneck in the water supply, and the little water that comes through is often contaminated. Given that the most impacted areas are also ravaged by poverty, the communities aren't capable of raising enough funds through taxation to rebuild their water systems.

The most cold hearted capitalists often make the argument that those who suffer the most from climate change now are at fault for not working harder to earn more money. Looking past the ignorance that fuels such cruel statements, an important detail is left out of the argument: those who will be the most impacted by climate change are not the people who are alive today, but the generations that will follow us. Because of how massive the planet is, climate lags behind emissions. As such, climate change is the ultimate form of intergenerational injustice. Even now, California's wildfires are burning faster and hotter than ever before (Smith and Wigglesworth). As the climate warms even further, vegetation will become even drier, and "all else equal, drier vegetation means more intense fires" (qtd. in Smith and Wigglesworth). The environmental mistakes we make today will devastate future generations. Since they have no way of stopping us now, it is our responsibility to bring change to our destructive lifestyles for their sake.

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