California Water Issues Communications Toolkit

Prepared by: Richelle Tanner Ph.D.

Contributors: Rama Bedri, Ava Cison, Chloe Gambeno, Ren Gebreamlak, Nuria Schettino González, Lauren Hu, Cara Hunter, Alyssa Kimura, Devyn Pon, Hannah Summers, & Zoe von Allmen

Chapman University December 2022

Table of Contents

Why California Water Issues?

A core goal of the “Environmental Advocacy Through Story” course is to provide skills that are career-oriented and help students make a difference in the world. We saw an opportunity with an environmental problem close to home, a record water shortage hitting California, to not only learn about how to apply the communications tools from the course, but also to help local organizations improve and unify their communications approach under an advocacy framework.

Much of environmental communications is reactionary. The climate action movement strives for solutions that are proactive, but this is difficult when research on psychology, societal interactions, and communication requires specific events to occur for study. We pursued the opportunity to investigate and prepare materials for a state-wide environmental problem this Fall of 2022, California water issues**.** This problem presented a challenge for the “Environmental Advocacy Through Story” course participants, as water issues are such a broad, all-encompassing collection of topics all with different causes and consequences, but they all relate back to climate change. We took this challenge to apply strategic framing concepts from class that were centered on climate change communications, and broaden our understanding of how additional storytelling elements could facilitate greater environmental literacy around water issues. Students applied their cultural knowledge unique to the local communities of California to present materials specific to these environmental affairs and their impacts. However, we hope that some of the resources can be strengthened and broadened for use in other settings later. Lastly, we also hope this is the start of a local action research framework for environmental communications that centers the input of communities in directing future areas of study. We look forward to working with any and all that this toolkit reaches, and welcome new colleagues to visit www.seacrlab.com/communitypartners to engage further.

About the Approach: Strategic Framing

Strategic communications are necessary for scientific topics intersecting with socio-political issues. For topics of the environment, this means that direct delivery of scientific facts is never recommended. Why? We all interact with information from a unique perspective shaped by our societal values, prior knowledge, privileges, and biases. No matter our best intentions, presenting only the “facts” allows our audience to impart their own assumptions about the process of science, the scientists themselves, and the influence of society on science. Therefore, we must integrate strategy into the presentation of scientific information. We must acknowledge that science is political, and not free of bias. Most importantly, we must approach environmental communication with the goal of improving science literacy structured for increasing community self-advocacy and civic action.

Framing allows diverse peoples to converge on a shared understanding of an issue or topic through the activation of cultural values and literal “frames of mind” (Price et al. 1997, Miller 2000). Framing allows us to reach across aisles or further solidify boundaries, depending on its targeted use. Studies have shown that if communicators can activate the appropriate positive

frame, our audiences are more likely to connect with and be open to the implications of the information we are sharing (Morton et al. 2011, Bilandzic et al. 2017).

Cultural values are often shared, yet still diverse and numerous among stakeholder groups living in the same area (Corner et al. 2015). Their intentional use in science-based messaging can bring diverse peoples together for a common cause and establish trust between the communicator and their audience (Jacobson et al. 2019). Cultural values also serve the additional purpose of reminding the audience why they should care about the topic (Pike et al. 2008). This allows an opportunity for the communicator to provide new information that the audience would not normally be receptive to.

Effective explanation requires yet again a “common currency” of knowledge, so that audience members may activate the same neural networks, or existing connections between ideas, in response to a communicator’s phrase (Goffman 1974). Since environmental research is often a new subject for most audiences, it is important to use metaphors to explain the science in a way that people can understand and that connects human actions to the issue (Duit 1991). Leading the audience through a step-by-step process also lessens the burden on communicators, given a prescribed framework for presenting new information. Having this framework also leads easily into framing the conversation for action and advocacy.

Communication without solutions strips stakeholder groups of their agency and investment in a problem (Swim et al. 2018). All stakeholders impacted by California water issues deserve an informed voice in the decision-making process that impacts their lives and livelihoods (Bodin 2017). When people begin to understand how they fit into their socio-ecological-political environment, they usually want to see themselves as part of a harmonious solution that benefits their community (Swim et al. 2018).

All of the pieces presented as part of this toolkit follow the same communication framework outlined in Figure 1. Each communication element has been researched from existing literature in peer-reviewed journals, cultural myths and legends, and generational knowledge in the local area. Therefore, each piece has a value, metaphor, explanatory chain, and solution. Also, each piece intentionally avoids unproductive cultural models, or “the swamp”, which are ideas that audiences may hold rooted in fear or misinformation. For more information on the research behind each piece, please refer to the annotated document with their explanations and sources. **We felt it was important to include this background information about our process, so that we could begin a conversation with local organizations about why strategic framing is necessary and offer Chapman’s future research collaboration on efforts they embark on in the future.**

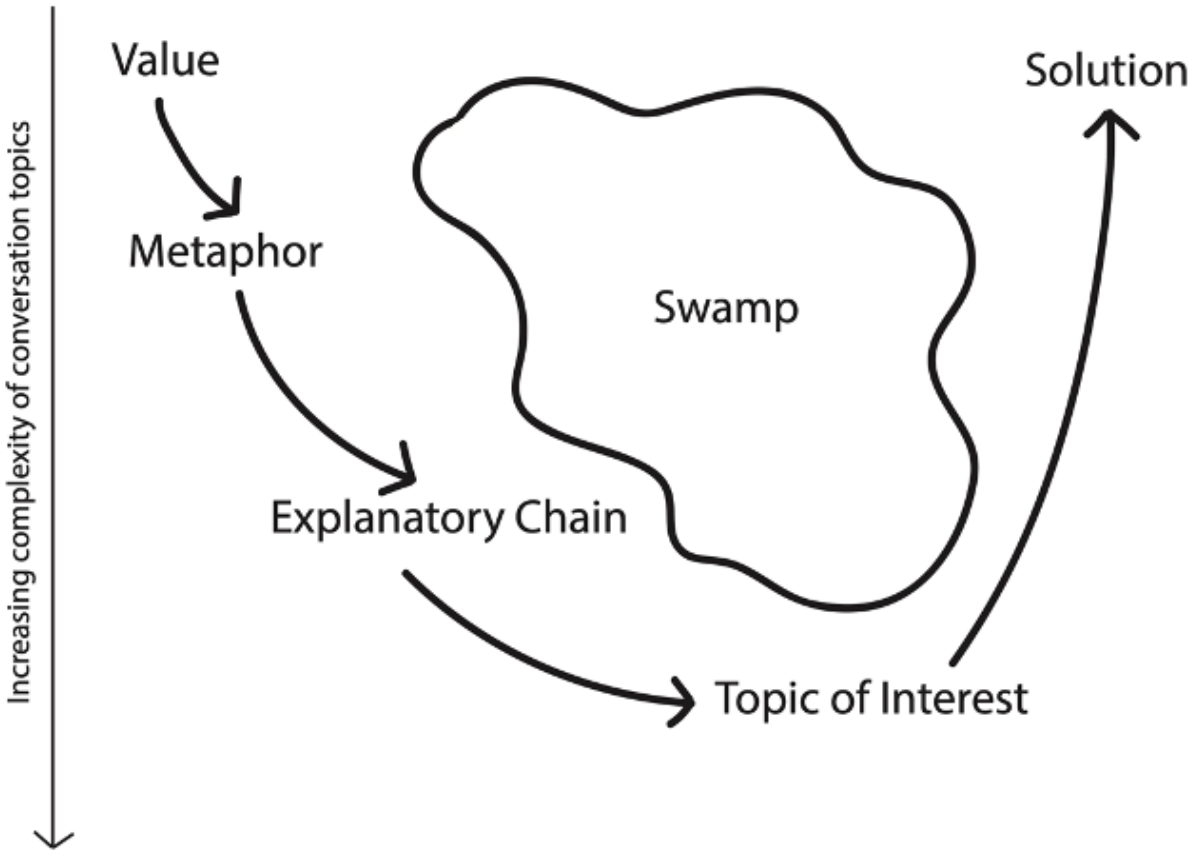


Figure 1. Values-based strategic framing communication framework from the National Network for Ocean and Climate Change Interpretation, presented in Bonnano et al. (2021), on which this toolkit is based. Original figure by R. Tanner.

Intended Audience

We acknowledge our status, as individuals in higher education, as trusted messengers is limited to few communities in the general public. However, individuals in higher education *do* have trusted status with environmental non-profits and government agencies. Research has shown that scientists, or those who are perceived as using expert scientific knowledge as a communication platform, are less likely to gain the trust of their audience through shared values (Volmert et al. 2013, Bales et al. 2015). Therefore, our most impactful work must be through other messengers who have already established trust with more diverse audiences.

We have included two maps, the first gives an example of overall power dynamics in intersectional water issues and the second shows how California water issues have impacted our targeted audiences with regard to the different types of societal impacts that water issues can have. We show the power map (Figure 2) to illustrate who has decision-making power and

direct influence over specific communities. This is one of the most important considerations when we identify trusted messengers for specific audiences. Not only must they share values and a common background, but one must hold more power so that the voices of the other can be elevated. We show the environmental impact map (Figure 3) to illustrate how the audiences targeted in this piece may interact with water issues, and therefore what kinds of scientific topics and resulting solutions will be most relevant.

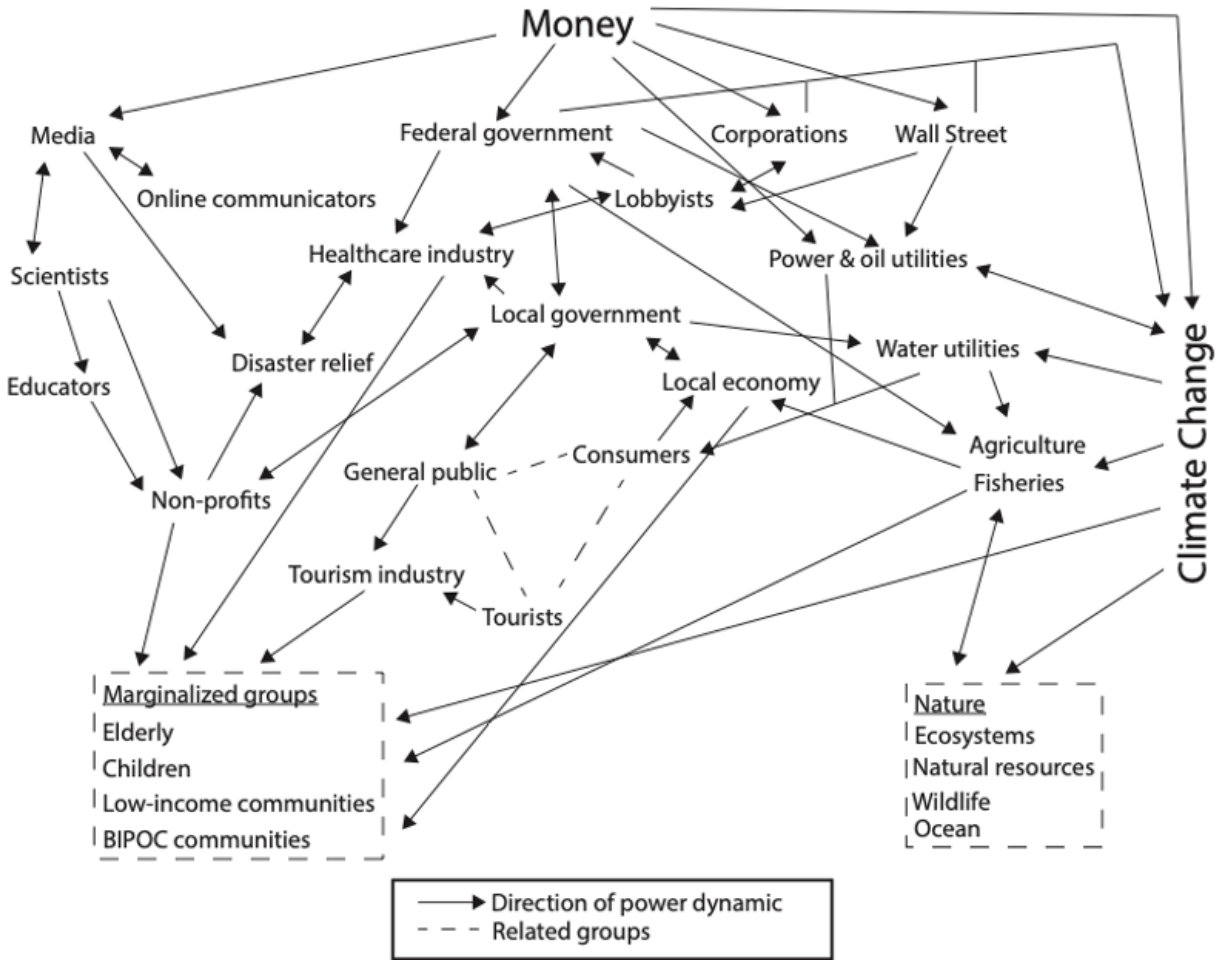


Figure 2. Stakeholder power map for environmental issues at large. This map is an example, not exhaustive, generated by the students of ENV 360 "Environmental Advocacy Through Story" and created by R. Tanner. Important to note is that marginalized groups and nature have very little power over other entities (no arrows going towards others). However, these are arguably the most important and impacted groups with climate change effects.

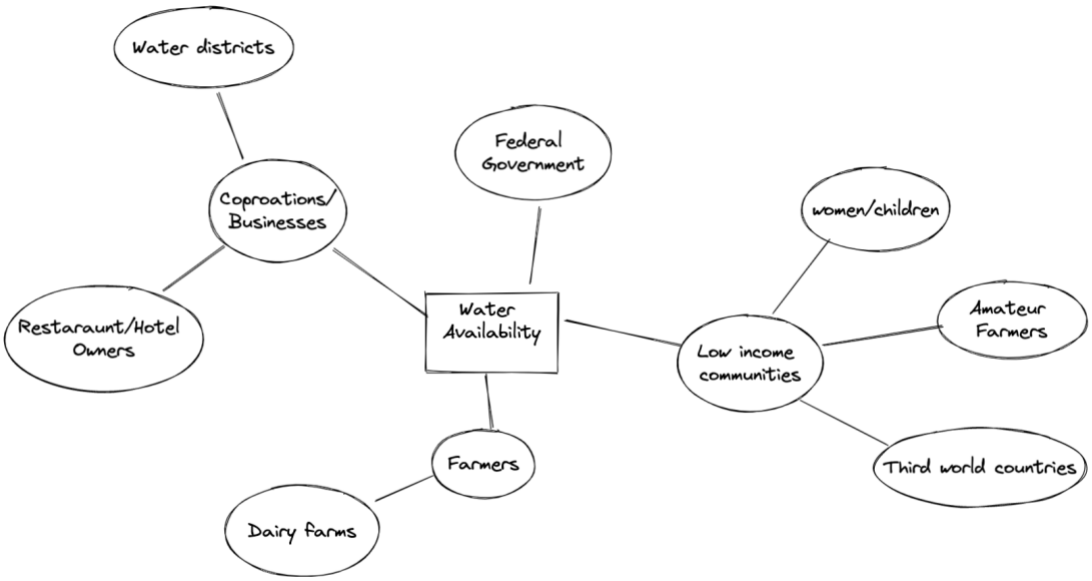


Figure 3. Environmental impact map for California Water Issues. This map is an example, not exhaustive, generated by the students of ENV 360 "Environmental Advocacy Through Story" and created by R. Tanner. Important to note that we specifically selected audiences to highlight in this toolkit based on representing the full breadth of societal impacts imposed by an environmental event caused by water issues. Environmental communication should not solely focus on environmental degradation because of the importance of intersectionality with social justice issues in climate action.

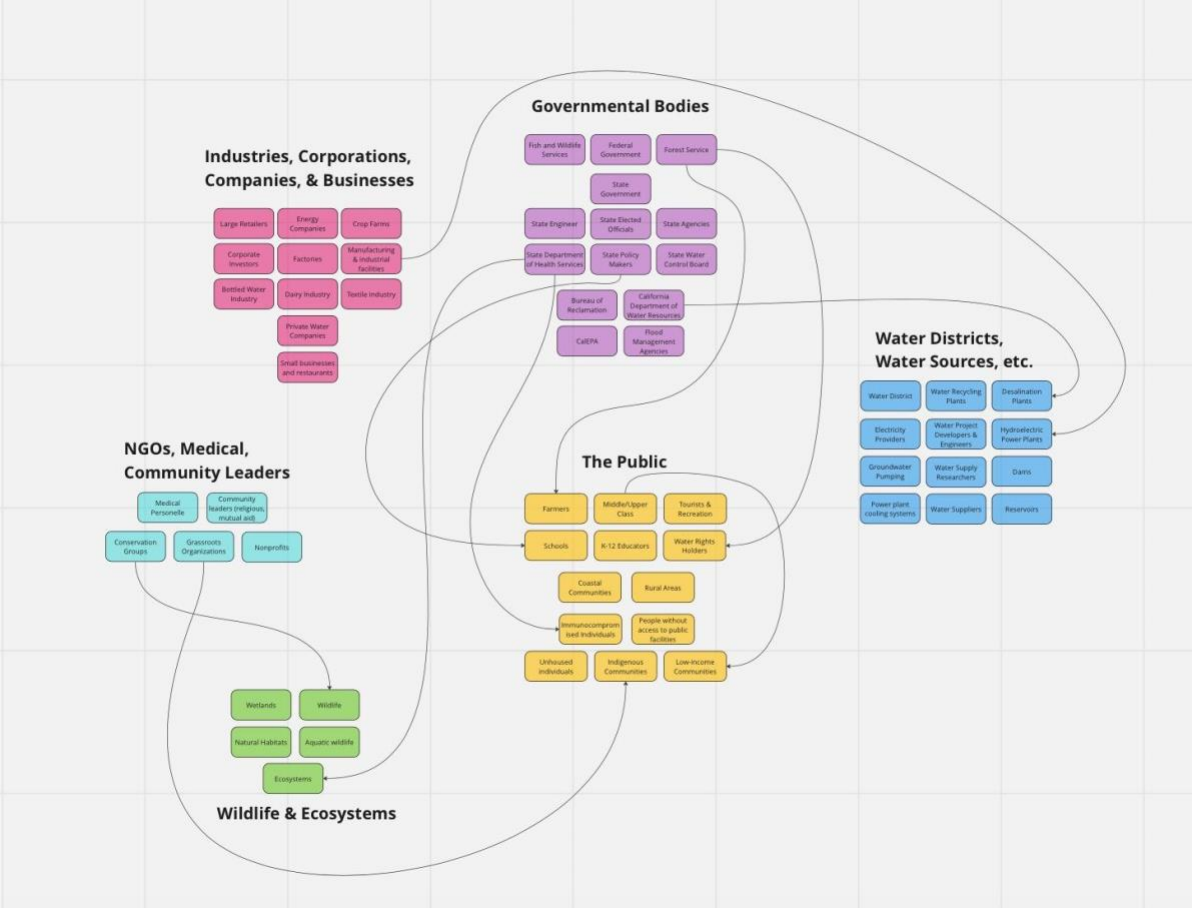


Figure 4. Stakeholder power map for water issues. This map is an example, not exhaustive, generated by the students of ENV 360 "Environmental Advocacy Through Story" and created by A. Cison & Z. von Allmen.

Limitations and Additional Resources

The limitations of this toolkit are imposed by the timeline on which we delivered the product. In less than two months, there was not sufficient time to conduct the primary social science research on whether the unique recommendations here are effective with their intended audiences. **The production of a peer-reviewed toolkit of this scope is at minimum a two-year endeavor.** However, the *approach* by which these recommendations were generated is a tested social science framework. We are happy to conduct follow-up research studies in partnership with local groups interested in reaching a particular audience over the next few years. This toolkit was also the first attempt by the students of ENV 360 "Environmental Advocacy Through Story" to apply the knowledge they developed as part of the course, at the same time they were gaining that knowledge. Their tenacity and dedication to applying their knowledge for this cause is remarkable. Lastly, we have leaned heavily on techniques tested for climate change communications by the National Network for Ocean and Climate Change

Interpretation, and as we have stated above, we are happy to further test these approaches for water issues specifically if there are interested parties for collaboration.

The sources cited above are a good start for investigating specific aspects of our approach, but we highly recommend reading the work of George Lakoff. Dr. Lakoff is a pioneer in this field, and a champion for the use of framing in political advocacy. His book, “Don’t Think of an Elephant”, is a good place to start with his highly-regarded writings. We also recommend the numerous trainings provided by the National Network for Ocean and Climate Change Interpretation: from a free asynchronous online course to a months-long training with multiple instructors, there is something for everyone. Please see more at www.nnocci.org.

If specialized training or presentations and/or further research is of interest to your group, we encourage you to directly contact Dr. Tanner at www.seacrlab.com or rtanner@chapman.edu.

Acknowledgements

We acknowledge that this work was conducted and presented on the unceded ancestral lands of the Tongva, Acjachemen, and Kizh peoples and pay our respects to elders past and present. We thank the Chapman University Environmental Science & Policy Program for the opportunity to take advantage of this unique opportunity to engage with local stakeholders as part of an undergraduate course. Lastly, we thank the local groups engaged with our presentation and thank them for the opportunity to have our materials used in the real world.

Works Cited

Bales, S., Sweetland, J., & Volmert, A. (2015). *How to talk about oceans and climate change*. Frameworks Institute.

Bilandzic, H., Kalch, A., & Soentgen, J. (2017). Effects of goal framing and emotions on perceived threat and willingness to sacrifice for climate change. *Science Communication*, *39*(4), 466–491.

Bodin, Ö. (2017). Collaborative environmental governance: Achieving collective action in social-ecological systems. *Science*, *357*(6352).

Bonanno, A., Ennes, M., Hoey, J. A., Moberg, E., Nelson, S.-M., Pletcher, N., & Tanner, R. L. (2021). Empowering hope-based climate change communication techniques for the Gulf of Maine. *Elem Sci Anth*, *9*(1), 00051.

Corner, A., Roberts, O., Chiari, S., Völler, S., Mayrhuber, E. S., Mandl, S., & Monson, K. (2015). How do young people engage with climate change? The role of knowledge, values, message framing, and trusted communicators. *Wiley Interdisciplinary Reviews: Climate Change*, *6*(5), 523–534.

Duit, R. (1991). On the role of analogies and metaphors in learning science. *Science Education*, *75*(6), 649–672.

Goffman, E. (1974). *Frame analysis: An essay on the organization of experience.* Harvard University Press.

Jacobson, S. K., Morales, N. A., Chen, B., Soodeen, R., Moulton, M. P., & Jain, E. (2019). Love or Loss: Effective message framing to promote environmental conservation. *Applied Environmental Education & Communication*, *18*(3), 252–265.

Miller, C. A. (2000). The dynamics of framing environmental values and policy: Four models of societal processes. *Environmental Values*, *9*(2), 211–233.

Morton, T. A., Rabinovich, A., Marshall, D., & Bretschneider, P. (2011). The future that may (or may not) come: How framing changes responses to uncertainty in climate change communications. *Global Environmental Change*, *21*(1), 103–109.

Pike, C., Herr, M., Minkow, D., & Weiner, H. (2008). Re: Green, The ecological roadmap, a guide to American social values and environmental engagement. In *Am. Environics.*

Price, V., Tewksbury, D., & Powers, E. (1997). Switching trains of thought: The impact of news frames on readers' cognitive responses. *Communication Research*, *24*(5), 481–506.

Swim, J. K., Geiger, N., Sweetland, J., & Fraser, J. (2018). Social construction of scientifically grounded climate change discussions. In *Psychology and Climate Change* (pp. 65–93). Elsevier.

Volmert, A., Baran, M., Kendall-Taylor, N., Lindland, E., Arvizu, S., & Bunten, A. (2013). *"Just the Earth doing its own thing": Mapping the gaps between expert and public understandings of oceans and climate change*. Frameworks Institute.

Authors' Positionality Statements

Rama Bedri

I identify as a female, Ethiopian-American raised in Las Vegas, Nevada. I am a third-year student at Chapman University with a major in Environmental Science and Policy and a minor in Mathematics. I gained interest in the subject after a trash sustainability project in AP Environmental Science in high school. I have experience researching drought in the Colorado River Basin. I analyzed changes in streamflow in Western U.S. rivers due to climate change. My internship at the Irvine Ranch Water District also contributes to my passion for water. I work hands-on with customers and advise them on how they can improve their home's water efficiency. I would like to pursue a career in Environmental Engineering with an emphasis on water resources management. I acknowledge that my knowledge of drought is partial, so I was thrilled to create this toolkit about drought for water districts. With my internship, I gain valuable experience with officials at the water district and learn about their backgrounds, but I am not an expert. I hope that this toolkit educates water providers on how to incorporate framing into their communication with customers.

Ava Cison

I identify as a white female raised in Chicago, Illinois. I am a third-year student studying Environmental Science & Policy at Chapman University. I do not live near an area with high levels of pesticide exposure, therefore I have a tremendous privilege of having limited personal experience with pesticide-contaminated water. Though I have recent experience with studying stormwater & drought in California, I have not conducted formal research on water contamination or pesticide exposure in farm worker communities. However, water contamination is extremely prevalent throughout Chicago. Citizens are disproportionately affected by this issue; many are forced to bear much heavier burdens of water contamination due to similar issues that affect water issues for farm worker communities in California. I hope to use this communication toolkit to propel community-level action in farm worker communities until the final solution of unionization is reached at a level that will adequately address all overarching needs.

Chloe Gambeno

I identify as a white female and I am a second year student at Chapman University. I am an Environmental Science & Policy major and a Sociology minor. I was born and have lived my whole life in Denver Colorado. Ever since I have moved to California it has opened my eyes to a different climate as well certain environmental issues. I am not an expert about these communities and have not been involved with water issue research. Even though I am not an expert, I am still listening to these communities in order to advocate for the environmental issues that are occuring. I have not had much research or hands on experiences with any water issue-related ideas which is something I hope to change in the future. My knowledge expands the more that I am interested in environmental policy. I strive to improve the scientific knowledge of the public in order for there to be a major effect on these environmental issues. I would like to pursue a career in the environmental science field but focusing more on the policy aspect. I

hope that my toolkit will be used on those who have been affected by the water issues and will help them effectively.

Nuria Schettino González

I identify as a female, Latina and Hispanic, with dual citizenship in Mexico and Spain. I am an immigrant as I was born and raised in Mexico City, Mexico, and moved to the Bay Area in California with my parents when I was 12 years old. I have cultural ties to Mexico and Spain and am privileged to visit my family on both sides frequently. I recognize my privilege coming from an upper-middle-class family in Mexico, with both of my parents having had a college education and holding professional jobs. I am a third-year undergraduate student at Chapman University, majoring in Film Production with an emphasis on Directing and double minoring in Environmental Science and Latinx and Latin American Studies. During my time living in California, I have never had to struggle with a lack of running water in my home, nor have I experienced contaminated drinking water or shut-offs. I did not have safe tap water at home while living in Mexico, but I never lacked clean drinking water from bottled sources. For this, I am very grateful and acknowledge that I cannot fully comprehend the struggles of the affected Latine audience I am trying to reach with my communications toolkit. While I share many of the same cultural values and language with the Latine audience I am writing to, I also lack an understanding of what it is like to live in rural, unincorporated, or low-income communities. I also acknowledge that I am not an expert in science communication, as this is my first class and experience in a research project of this kind. Regardless, I have always held a deep regard for environmental protection, environmental justice, and social justice, especially when it concerns Latine individuals and communities. Lastly, I would like to note the use of the word “Latine” in our communication piece when referring to Latino/a/x individuals; We have adopted this term as a gender-neutral identifier, friendly to Spanish pronunciation. However, I respect and understand those that may not be familiar or comfortable with this term and prefer to identify with the general “Latino” expression. My goal in this toolkit is to provide individuals, especially in Latine communities, with information and resources to support the fight for clean, affordable drinking water for all.

Lauren Hu

I identify as a female, first-generation Taiwanese-American from Cupertino, California. I am a third-year student at Chapman University double majoring in Economics and Environmental Science and Policy. Although I was born in the U.S., I spent the first 12 years of my life in Taichung, Taiwan. My passion for environmental science started in high school when I took AP Environmental Science and amplified even more during 2020 when I took a lot of time into self-exploration and finding out what matters to me. When I first moved to California in 2014, one of the first culture shocks I experienced was having to learn about water conservation due to the frequent droughts in California. Growing up, I was always taught to save water, but Taiwan did not experience water scarcity as severe as California. I recognize my privilege of having access to clean drinking water my whole life. Before this project, I have not done scientific research on the issue of water. Working on this toolkit and learning more about water over this semester has taught me effective skills in communicating environmental issues to different audiences. Moving

forward, I hope to apply what I learned not only to my future career but also to my everyday life educating my friends and family on different environmental problems.

Cara Hunter
I am a white woman, college student studying Environmental Science and Policy and Political Science. I grew up in a working class family near lots of farmland in Washington State. For as long as I can remember, I have been motivated by a yearning for fairness. I am passionate about labor rights and restructuring of an unfair economic system that prioritizes profit over the people and planet. In recent years, I have learned more about the role unions and collective organizing plays in correcting the unfairness bred by the current organization of the economy. Because of this, I looked at this issue of agricultural pollution affecting historically exploited groups of people through a lens of collective organizing. Though I am studying environmental science and policy and political science, I am not an expert in either field nor have I faced the severe health impacts from pesticides that farm workers in California experience. I have engaged in community building and grassroots organizing in my hometown, so I applied what I have learned from those experiences to this project.

Alyssa Kimura
I am a second generation Japanese woman born and raised in Torrance, California. I am a third-year student at Chapman University majoring in Environmental Science and Policy, and Peace Studies. I am particularly interested in environmental policy and the ways in which issues can be approached systematically. I grew up rescuing exotic animals and enjoyed exploring nature which developed my strong connection to animals and the environment. Growing up in southern California, I witnessed and experienced the stress that droughts and water scarcity can cause. My community often needed to adjust our water consumption habits and was even taught at public schools about why water is such a limited resource for us. I also work for a small business where I have gained experience in greywater recycling and other sustainable initiatives that have been developed in response to environmental issues. While my expertise is limited in the research, communication, and biological sciences of this topic, I plan on expanding my knowledge and understanding of these issues with the intention of pursuing a career in environmental policy-making. I hope to gain some hands-on experiences through research projects and engage in courses that will help me develop a more professional and comprehensive idea of the intersectional impacts that climate change has on the world. Through the research and development of this tool kit, I hope to bring awareness of the water issues we face today as well as incite meaningful conversations that promote positive change in society.

Devyn Pon
I identify as a 20 year old American male, second-generation immigrant of mixed heritage. Half white (specifically Scandinavian and Irish) from my maternal side and half Chinese from my paternal side. I was raised entirely in San Diego, CA in a middle-class suburban area with both my parents, attending both public and private schools at times. I did not have any personal environmentally related struggles but I frequently experienced wildfires and as a Southern Californian, was often reminded of water sustainability and was knowledgeable of ongoing

droughts. As a child I loved nature, and both my parents emphasized not wasting anything, including food, water and electricity, so I grew up environmentally inclined. I am currently a third-year student at Chapman University pursuing a bachelor's degree in Environmental Science and Policy as well as double minors in Japanese Studies and Art. Throughout my time from childhood to now I have attended classes and volunteered at organizations emphasizing environmentalism and have thus obviously become even more passionate about environmental issues as a whole. While ecology is my passion in terms of what I want to study, I still have interest in other types of environmental issues, and took up an internship at a water investigation organization which taught me many things about stormwater runoff and management. This class put lots of focus on environmental communication and the conveyance of information tailor-based to certain demographics, and I have grown more accustomed to this more social aspect of science and how to use it. I plan to use what I learn going forward to help me find a career in a job I enjoy and if I can help change the world while I'm at it that would be nice.

Hannah Summers

I am a white female who is currently studying at Chapman University, pursuing a degree in Environmental Science & Policy. I was born and raised in Orange County, California and have lived my entire life near bird sanctuaries and the ocean. My upbringing is an important part of who I am and how I perceive ongoing issues. While living in Orange County my entire life, I have not personally experienced any of the effects of water inequities within California. Although, my education has brought me opportunities to grow and learn about important water issues happening in California. My interest in environmental policy has influenced me to become more aware of water issues and pursue an opportunity to present my findings and ideas to a larger group of people. My hope is that those who are directly affected and indirectly affected by water issues will receive my toolkit and use it to help their community.

Richelle Tanner Ph.D.

I identify as a female, mixed heritage Chinese-white first generation American with roots in the Pacific Northwest. I am a researcher of environmental communications (among other natural sciences topics), a professor at Chapman University, and the 2019-2021 Science Director at the National Network for Ocean and Climate Change Interpretation. My research informs water policy in the Sacramento-San Joaquin Delta and San Francisco Bay, I have received funding from the State Water Contractors and the Delta Science Council, both of which represent water interests in this area, and I have many active collaborations with the Department of Water Resources, the United States Geological Survey, and CA Fish & Wildlife. I am not an expert in what it is like to live in the world as the audiences we hope to reach, including but not limited to people of color and individuals deprived of environmental literacy. Lacking this experience, I look to my students and their trusted sources and honor the experiences of these marginalized groups. The work presented in this toolkit is the labor of students in my “Environmental Advocacy Through Story” course in Fall 2022, of which I am immensely proud of and thankful for. Therefore, I limit the scope of this presented work to a preliminary exploration of effective communication techniques in these distinct communities for selected water issues in California.

I cannot speak to their direct effectiveness, only to the efficacy of the methodological framework under which they were conceived. Where possible we cite the knowledge of others who have expertise, whether in the scientific literature or in generational knowledge. The goal of this work is to raise awareness about how audience specificity in communications matters, and orient local non-profits along a unified communications framework based in social science research that centers hope instead of fear, advocacy for marginalized groups, and community-level solutions for climate action. More about my research and further learning opportunities can be found at www.seacrlab.com.

WATER CONTAMINATION

in the San Joaquin Valley

CONTAMINATED DRINKING WATER IN LATINE COMMUNITIES: WHY, AND HOW TO SOLVE THIS ISSUE

We must step in and advocate for the protection and welfare of others

WATER CONTAMINATION

Water systems within the **San Joaquin Valley** have the **highest rates** of drinking water **contamination** in the state.

Water systems serving predominantly **Latine communities** have disproportionately high occurrences of **nitrate contamination**

CAUSES:

The **San Joaquin Valley** accounts for **over half** of California's agricultural production. Nitrate levels in the San Joaquin Valley have increased due to agricultural intensification

Other factors contributing to the water contamination include aging infrastructure, which seeps contaminants into the drinking water, and a lack of funds/ investment for new or repaired infrastructure

Sources:
1. https://doi.org/10.1111/1753-6405.13222.
2. https://www.nationalpartnership.org/our-work/health/repro/reports/clean-water-case-study-san-joaquin-valley.html
3. https://www.communitywatercenter.org/the-challenge

WHAT'S THE HARM?

Think of nitrate levels as **blood pressure**: too high of "blood pressure" can lead to **extreme health issues**

Colon and **colorectal cancers** are linked to rising **nitrate levels** in drinking water

SOLUTIONS:

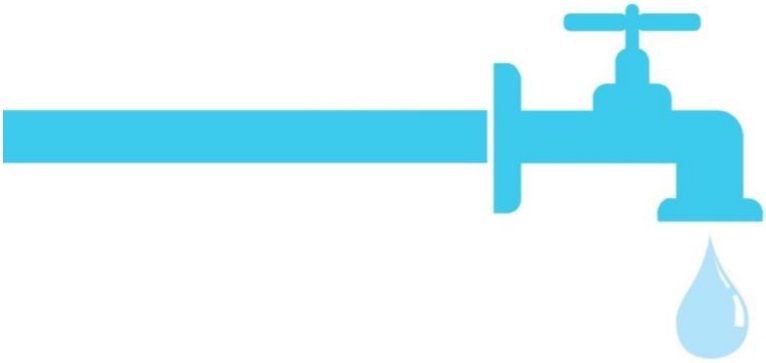
- strong water policies
- management support/ coordination
- funding

Support solutions by advocating for strong water policies and donating to the groups that fund water equity projects:

Supporting Advocacy Groups:

- Community Water Center
- AGUA Coalition
- GreenLatinos

Learn more about these advocacy groups and their work, and donate here:



WATER DEFICIENCY

In the San Joaquin Valley

WATER DEFICIENCY IN LATINE COMMUNITIES: WHY?, AND HOW TO SOLVE THIS ISSUE

We must be responsible for preserving water resources within communities with limited water availability. Future generations will depend on how we take action

DEFICIENCY FACTS

1. **12,000 wells**

could go **dry** in California by 2040 as a result of **unsustainable groundwater** use.

2. Low-income rural Latine communities in California were the hardest hit by the latest drought and are the most likely to experience freshwater shortages as extreme drought spreads across the country.

San joaquin valley residents **depend** upon the reservoir of **groundwater** in order to access water

As over-pumping groundwater persists, community and shallow domestic water wells continue to run dry. As a result, the communities' water supply throughout the state becomes threatened

Sources:

1. https://calmatters.org/environment/2021/08/california-groundwater-dry/
2. https://www.ppic.org/publication/groundwater-and-urban-growth-in-the-san-joaquin-valley/
3. https://climatepower.us/resources/once-again-extreme-drought-heatwaves-and-wildfires-threaten-latinos-in-the-west/

WHY IS GROUNDWATER IMPORTANT?

Groundwater acts like a "**savings account**", a reservoir to rely on in times of need.

When we deplete our "savings account", we have nothing left.

SOLUTIONS:

- physical connections of water systems
- management support/ coordination
- funding

Support solutions by advocating for strong water policies and donating to the groups that fund water equity projects:

Supporting Advocacy Groups:
- Community Water Center
- AGUA Coalition
- GreenLatinos

Learn more about these advocacy groups and their work, and donate here:

CONTAMINACIÓN DEL AGUA

en San Joaquín Valley

AGUA POTABLE CONTAMINADA EN COMUNIDADES LATINAS: POR QUÉ Y CÓMO RESOLVER ESTE PROBLEMA

Debemos participar y apoyar la protección del bienestar de los demás

CONTAMINACIÓN DEL AGUA

Los sistemas de agua dentro del **valle de San Joaquín** tienen los **grados más altos** de **contaminación** de agua potable en todo el estado.

Los sistemas de agua de las **comunidades latinas** tienen una incidencia desproporcionada de **contaminación por nitratos.**

CAUSAS:

El **valle de San Joaquín** aporta **más de la mitad** de la producción agrícola de California. Los niveles de nitrato en el valle de San Joaquín han aumentado debido al incremento de la actividad agrícola.

Otros factores que contribuyen a la contaminación del agua son tuberías y equipo viejos que le meten contaminantes al agua potable y la falta de fondos y de inversión en infraestructura nueva.

Fuentes:
1. https://doi.org/10.1111/1753-6405.13222.
2. https://www.nationalpartnership.org/our-work/health/repro/reports/clean-water-case-study-san-joaquin-valley.html
3. https://www.communitywatercenter.org/the-challenge

¿CUÁL ES EL DAÑO?

Piensa en los niveles de nitrato como si fueran tu **presión sanguinea**: una presión muy alta puede provocar **graves daños a la salud**

Entre otros, el **cancer de colon y de recto** están ligados a los crecientes **niveles de nitratos** en el agua potable.

SOLUCIONES:

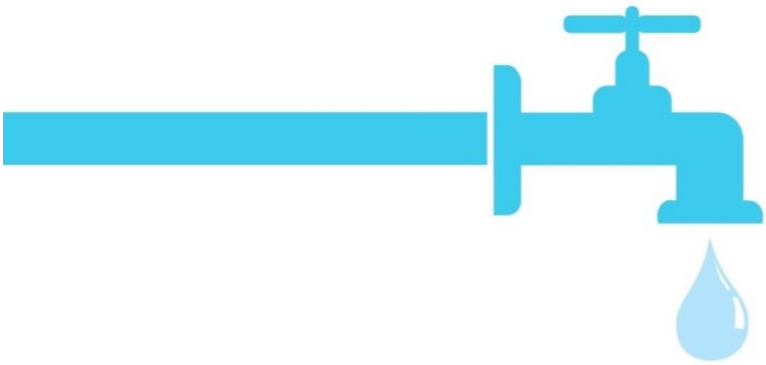
Contribuye a las soluciones que promueven políticas más estrictas para el manejo del agua y haz donaciones a los grupos que financian proyectos de uso igualitario del agua:

- políticas más estrictas para el manejo del agua
- administración: soporte y coordinación
- fondos

Grupos de apoyo:

- El Centro Comunitario Por El Agua
- AGUA Coalition
- GreenLatinos

Aprende más sobre estos grupos y su trabajo, y dona aquí:



FALTA DE AGUA

en San Joaquín Valley

FALTA DE AGUA EN COMUNIDADES LATINAS: POR QUÉ Y CÓMO RESOLVER ESTE PROBLEMA

Debemos ser responsables de conservar el agua en nuestras comunidades con poca disponibilidad de agua. Las generaciones futuras dependen de nuestros actos

HECHOS SOBRE LA FALTA DE AGUA

1.

12,000 pozos

podrían **secarse** en California para el año 2040 como resultado del **uso no sostenible del agua del subsuelo**

2.

Las comunidades de bajos ingresos de California fueron las más afectadas por la reciente sequía, y son probablemente las que tendrán recortes en su suministro de agua cuando la sequía se extienda por todo el país.

Los residentes del valle de San Joaquín **dependen** de los **depósitos del subsuelo** para tener agua

Mientras persista el bombeo excesivo del agua del subsuelo, los pozos comunitarios y los de agua para las casas continuarán secándose. Como resultado, el abasto de agua a las comunidades por todo el estado está en peligro.

Fuentes:

1. https://calmatters.org/environment/2021/08/california-groundwater-dry/
2. https://www.ppic.org/publication/groundwater-and-urban-growth-in-the-san-joaquin-valley/
3. https://climatepower.us/resources/once-again-extreme-drought-heatwaves-and-wildfires-threaten-latinos-in-the-west/

¿Por qué es importante el agua del subsuelo?

El agua del subsuelo es como una "**cuenta de ahorro**", un depósito que se puede usar cuando se necesita.

Cuando vaciamos nuestra "cuenta de ahorro" , ya no tenemos nada.

SOLUCIONES:

- conexiones físicas entre los sistemas de agua
- administración: soporte y coordinación
- asignación de fondos

Contribuye a las soluciones que promueven políticas más estrictas para el manejo del agua y haz donaciones a los grupos que financian proyectos de uso igualitario del agua:

Grupos de apoyo:

- El Centro Comunitario Por El Agua
- AGUA Coalition
- GreenLatinos

Aprende más sobre estos grupos y su trabajo, y dona aquí:

Latine Communities

AUDIENCE

This communication piece addresses the issue of water inequity in the San Joaquin Valley of California, primarily affecting the Latine communities living in disadvantaged or rural areas. Latines are defined as any person of Latin-American descent. For our primary audience, Latine residents, we highlight the supply and quality issue that continues to impact these residents and urge them to raise their voices and join the community groups at the forefront of the fight for affordable, clean drinking water for all. It should be noted that unincorporated communities and other Latine populations in or outside the Central Valley suffering from water injustice are also considered part of the primary audience.

Certain values shared within Latine communities may be beneficial to the communication of this issue, facilitating the call to action for this audience. For example, many Latines come from collectivistic cultures where responsibility and accountability are collective, emphasizing group harmony and cooperation, rather than individual roles and responsibility. This orientation may be an asset in the promotion of community health. In addition, morbidity may be regarded as a higher concern than mortality, thus heightening attention to diseases associated with water contamination. Regarding language, bilingual communication will reach a larger Latine audience, as many individuals communicate and consume media in Spanish as well as English, or a mixture of both. However, we must remember that not all Latine individuals identify with the same cultural values, and these principles are not meant to stereotype or define an entire ethnicity.

The information presented and the infographic component of this communication piece may be shared at any moment with the intended audience, or with any individual that may become interested in learning about water inequity and supporting the solutions and organizations suggested*. These organizations and their representatives, such as Community Water Center (and Community Water Leaders Network), the AGUA Coalition, and GreenLatinos, are also part of our trusted communicators, who have established themselves as catalysts for community action and have the outreach tools, shared values, and members, to promote this toolkit. These are advocacy groups dedicated to supporting projects and legislation to prevent water shutoffs and make clean water affordable for all by mobilizing residents through education, campaigns, and investments.

While our audience is the San Joaquin Valley community, we not only aim to communicate with the local communities and local governments, but with the general California public to inspire them to spread awareness about the water issues in the state. Our communication piece may also be used in a large group setting where policymakers and residents are present, or with specific stakeholders, including the San Joaquin Valley advocacy groups which have established resources and community actions that we have explicitly recommended within our communication piece. This framing toolkit is specifically designed to relate to residents of the San Joaquin Valley, as we have appealed to certain values that they uphold. In addition, we have used metaphors that will be effective in communicating our message to our audience. Our communication piece is specifically tailored to the San Joaquin Valley community, as they are most likely to take action because they are disproportionately affected by the issues.

* See “SOLUTIONS”

AUDIENCE UNDERLYING ISSUE

As a region with high levels of social vulnerability and environmental hazards yet occupying the highest ranks of agricultural productivity and wealth, it is essential that the people

that care for and live on the land and the domestic well communities are not neglected along with their aging water systems. Safe drinking water must be equally accessible as a human right, yet studies have shown that the relationship between arsenic and nitrate concentrations in community water systems and the ethnicity of the water recipients is higher when the inhabitants are Latine (Ray et al., 2011). When deficient resources are paired with poorly enforced building codes, health laws, protection, monitoring, and reporting, disparities in water quality, cost, and reliability are bound to occur. As a result, water contamination due to inadequate infrastructure and services lead to harmful health outcomes, disproportionately affecting people of color and residents in low-income areas.

In addition to structural issues, there are historical conditions that have contributed to the lack of safe drinking water in Latine communities. For example, there have been inequities in funding, a lack of political power to advocate for access to a safe water supply, and non-compliance with federal water standards. Also, segregation exists through the municipalities' selective exclusion of city boundaries to serve or deny basic services to certain areas (Vaughn et al., 2020). Individuals in poor communities that have been historically marginalized then have to pay coping costs, such as the cost of bottled water, as a result of a composite burden (Balazs et al., 2014). The environmental injustice that Latine residents face in drinking water may be a result of a combination of these factors, including residents' political disenfranchisement, regulation failures, contaminated water sources, and a lack of community resources and mitigation strategies.

WATER INEQUITIES: WATER DEFICIENCY

- **VALUES:**
    - Be vigilant in ensuring that the problem doesn't get worse
    - Be responsible with the resources given to us
    - Future generations

Communication Piece:

We must be responsible for preserving water resources within communities with limited availability. We must look ahead and ensure that the lack of water availability is maintained. Stepping in and providing enough water is available for these communities is the right thing to do. Future generations will depend on water availability, so we must take the appropriate measures to ensure that all communities have water. Responsibly using the water available to you preserves a way of life for community members. To be responsible for preserving water availability, we need to have a practical, step-by-step plan that details how we can make progress on mitigating the lack of water availability.

Latine communities of San Joaquin Valley are promised access to safe water; however, they are disproportionately affected by water inequities. We must advocate for these communities to ensure they retain access to enough safe water. We should help people in need who are affected by inadequate systems.

- **METAPHOR:**

Communication Piece:

Groundwater acts like a "**savings accoun**t", a reservoir to rely on in times of need. Although, savings accounts need to be replenished, and the San Joaquin Valley takes too much water out of their "savings account". This over dependence on groundwater ultimately leads to groundwater "overdraft".

- **EXPLANATORY CHAINS:**

Communication Piece:

Within California, the San Joaquin Valley specifically depends on the availability of groundwater in order to provide themselves with safe drinking water. As a result of the strong reliance on groundwater, we are seeing water withdrawals within the San Joaquin Valley. It is extremely important to understand the effects of over reliance on groundwater. In time, the San Joaquin Valley will no longer be able to have availability of water. Due to the dry climate, water has become scarce and disappearing.

CAUSES:

- Due to the dry climate, return flows, and tremendous agricultural demand, alternative water sources in the southern Central Valley are scarce.
- Intense droughts lead the land to submerge and become compressed.
- In turn, when these compressed lands pump out groundwater, it increases the low surface-water availability. (Faunt et al., 2015)

WATER INEQUITIES: WATER CONTAMINATION

- **VALUES:**
    - Showing concern for the welfare of others
    - Stepping in to ensure peoples safety and wellbeing

Communication Piece:

We must advocate for protecting water resources within communities that consume unsafe water. Showing concern for those who do not have access to safe water is the right thing to do. We must take measures to ensure that all communities get safe water. Protecting water resources means actively eliminating the risks and toxins that affect the water. It is essential to be attentive in safeguarding all communities from harm.

Within California, access to clean water is considered a human right, although some areas do not meet this standard. Latine communities of San Joaquin Valley are promised access to safe water; however, they are disproportionately affected by water inequities. We must advocate for these communities to ensure people's safety and well-being. Advocating for their right to safe water means creating a practical plan to make progress and help those who are affected by flawed systems.

- **METAPHOR**

Communication Piece:

The San Joaquin Valley has been disproportionately affected by high levels of nitrate within their water. The nitrate level is like **blood pressure;** too high can lead to extreme health issues.

High blood pressure can lead to multiple health issues just like high levels of nitrate within water leads to risk in cancer.

- **EXPLANATORY CHAINS**

Communication Piece:

Consuming water contaminated with nitrate can cause direct harm to human health. These health risks include an increased risk of cancer. Colon and colorectal cancers are linked

to rising nitrate levels in drinking water. Understanding the effects of these chemicals within the water is essential to determine future changes. In the San Joaquin Valley, the Latine community is disproportionately impacted by dangerous nitrate levels in their drinking water.

CAUSES:

- The San Joaquin Valley is disproportionately affected by water inequities caused by aging infrastructure (PPIC, 2018). Community leaders within the San Joaquin Valley lack funding and resources to tackle the infrastructure affecting the water quality. In areas with Latine inhabitants, the infrastructure continues to diminish and seep contaminants into drinking water.
- Due to the San Joaquin Valley's aging infrastructure, most residents have experienced unsafe toxic contaminants within their drinking water. On a state-wide scale, 80% of Californians are concerned about the current water quality problems and have first-hand experiences with unsafe water (Fairbank, 2017). California water supplies have found unsafe arsenic, nitrates, uranium, and perchlorate levels within drinking water (Fairbank, 2017). A recent Californian study has exposed that nearly all Californians (71%) agree that the state should invest in new infrastructure if that means ensuring drinking water safety (Fairbank, 2017).
- The San Joaquin Valley is the backbone of California's agricultural industry
- Increased nitrate levels in the San Joaquin Valley have increased due to agricultural intensification (Chambers, 2022). Agricultural runoff from both manure and fertilizer seeps into the groundwater, increasing the amount of nitrate

SOLUTIONS BACKGROUND

Groundwater contamination disproportionately affects smaller, rural communities, with fewer resources to invest in water treatment and drill deeper wells for safe groundwater access. Furthermore, domestic wells are not required by the state to test water quality. A lack of information on the wells' depth, location, and quality makes it more challenging to address and improve their water quality issues. In addition, without formal and transparent accounting, groundwater is prone to be over-pumped, contributing to the supply issue. While finding diligent solutions will require collaboration from the local agents, the state, environmental justice advocates, and urban water systems, individuals and communities can join the effort to advocate for these solutions.

Previous solutions have been implemented to address water quality issues in the San Joaquin Valley. Several regulatory programs, orchestrated by numerous state and local entities, instruct practical actions to address water inequities. Regulatory legislation includes the federal Safe Drinking Water Act, Clean Water Act, and the state's Porter-Cologne Act. Water quality programs and mandates are implemented by different entities, aiming to achieve safe drinking water, prevent pollution, or both. For instance, counties and public water systems implement safe drinking water regulations, while groundwater sustainability agencies (GSAs) are responsible for carrying out the Sustainable Groundwater Management Act (SGMA). The SGMA creates a framework for local agencies and stakeholders to develop plans, implementation strategies, and institutions to sustainably manage groundwater resources in order to avoid exceedingly low water levels, degraded water quality, land subsidence, and aquifer storage depletion, among other adverse effects.

One of the main tasks of GSAs is to implement the SGMA. It is essential that the SGMA tasks are carried out to balance the supply and demand of groundwater, which also affects the quality of the drinking water. Facilitating this realization will require greater coordination at the basin scale between the GSAs and various stakeholders, including community groups,

environmental non-profits, city and county planners, farmers, and businesses, among others. Basin-scale regional planning efforts to protect groundwater quality and manage the implementation of SGMA must be strengthened, building on forums such as the California Partnership for the San Joaquin Valley and the San Joaquin Valley Regional Policy Council that have been created to address resource management issues. Investing in the transition and success of SGMA will require efforts from all levels of stakeholders.

Source: Hanak et al., 2019

SOLUTIONS: WATER DEFICIENCY + WATER CONTAMINATION

Some of the most effective, active solutions to drinking water problems include physical connections, management support, and funding. Physically connecting or consolidating small water systems with larger systems could address the supply issue by pairing unincorporated areas with more resilient water systems, such as in the case of East Porterville merging with the city of Porterville. Consolidation is not limited to water systems, as the merging of institutions could provide economies of scale in management and technical costs to smaller water systems and administrations. Local administrations could benefit from the resources of larger organizations while maintaining their own governance. Furthermore, the most needed component to support these solutions is ongoing funding. While politics may challenge the establishment of statewide funds, GSAs, organizations, and individuals may still contribute to other sources of regional funding.

Understanding the priorities for regional action, residents, affected parties, and allies can take this knowledge to join the groups and efforts dedicated to ending this safe drinking water inequity. For the supply issue, priorities include the assessment of infrastructure needs to expand water storage and transportation, as well as to strengthen basin accounting. Regarding the quality issue, priorities include management coordination and GSAs' development of plans to prevent the loss of safe drinking water supplies in rural areas. Regardless, while the state and federal agencies may be responsible for providing clean access to drinking water for all its citizens as a human right, relying on governments to act may prove insufficient when faced with shortage emergencies and long-term water contamination inaction. However, how can individuals advocate for these solutions, and where can donations go to support the funding of these projects?

Source: Hanak et al., 2019

Fortunately, there are various non-profit advocacy groups dedicated to this effort. For instance, The Community Water Leaders Network, part of the Community Water Center, sees the formation of active community leaders in the San Joaquin Valley who advocate for the inclusion of rural and low-income communities in water decisions and policies. Other organizations one can donate to include the AGUA (Asociación de Gente Unida por el Agua) Coalition and GreenLatinos, who support strong water legislation and invest in infrastructure and water access projects, among many initiatives. As fellow residents of California, whether directly impacted by water shortage and contamination issues or not, we must stand with the Latine communities in the San Joaquin that have been disproportionately affected by water inequity. These efforts are possible through the involvement of communities united to bring reforms and funding to the areas most affected by the lack of affordable, clean water. One's contribution is not limited to donating or becoming a member of these organizations, as sharing these issues with our close ones, as well as community leaders and policymakers, can have a large impact in uplifting their cause. Supporting the local groups and voices at the forefront of the fight for clean-water-for-all is essential, as the welfare of our neighbors is at stake.

ANNOTATED BIBLIOGRAPHY

National Network for Ocean and Climate Change Interpretation - NNOCCI (2017). Responsible Management Reframe Cards
https://climateinterpreter.org/resource/responsible-management-reframe-card

This source given to us by NNOCCI provided us with tested values on how to effectively communicate our water issue. This specific source scientifically tested how responsibility management as a value is effective to thousands of Americans. We have chosen this source because it has been scientifically tested to communicate effectively with people.

Water Resources. San Joaquin County. 2022.
https://www.sjgov.org/department/pwk/water-resources

This source gave us insight into what the San Joaquin Valley community values about the lack of groundwater. The Water Resources Team engages with the San Joaquin Valley community and advocates for policy change. The community advocates for the lack of groundwater and relates to the fact that the audience must be responsible to preserve and conserve water. They have taken steps to mitigate the lack of water availability by advocating for policy change.

San Joaquin Valley. Community Water Center. 2022.
https://www.communitywatercenter.org/sjv.

The San Joaquin Valley community is attentive to the inequities occurring in the Latine community due to the fact that they are the one's disproportionately affected. This advocacy group, The Community Water Center, speaks for the Latine community within the San Joaquin Valley. This is the best source of information due to the fact that this comes straight from the community itself.

National Network for Ocean and Climate Change Interpretation - NNOCCI (2017). Protection Reframe Cards
https://climateinterpreter.org/resource/protection-reframe-card

This source by NNOCCI provided us with protection reframe cards that gave us the ability to use tested values within our communication piece. This specific source scientifically tested how using protection as a value is effective to thousands of Americans. In order to communicate effectively, we have chosen this source because it is reliable and scientifically proven.
"The Challenge". Community Water Center. 2022.
https://www.communitywatercenter.org/the-challenge.

One quote on their website states, "The majority of people in our town have died of cancer. It just does not make sense. I have people here who have little kids. I want them to be able to go, get up, and be able to drink water." by Josie Nieto, Seville, CA, AGUA Coalition member. This first-hand source explicitly shows that the San Joaquin Valley community values the issue that our framing piece encompasses.

Stahl, Leslie. "Depleting the water". CBS News. 16 November 2014.

https://www.cbsnews.com/news/depleting-the-water/

This source provided us with a metaphor to effectively communicate our water issue. This news source is specifically tailored to the residents of California. This relates to our audience because this news source gives us information set in California. In addition, the setting of our communication piece will be used within the San Joaquin Valley of California, where this news piece is especially relevant.

National Network for Ocean and Climate Change Interpretation - NNOCCI (2017). Metaphor Reframe Cards
https://climateinterpreter.org/resource/metaphor-reframe-cards

This source provided us with the information to effectively craft our metaphor in a way our audience will understand. The use of their metaphors has given us insight into how we can effectively craft our metaphors. This is the best source to be used in our framing piece because they have scientifically tested the use of metaphors and how it is the best way to communicate a climate issue.

Community Water Center. Guide to Community Drinking Water Advocacy. 2009.

This source was extremely helpful in guiding us through the process of water contamination within the San Joaquin Valley. This specific source comes straight from the advocacy group Community Water Center for the San Joaquin Valley. It gave us the necessary information needed to craft our metaphor.

Resources U of C Division of Agriculture and Natural. UC Davis Report for the SWRCB SBX2 1 Report to the Legislature. https://groundwaternitrate.ucanr.edu.

This source analyzes the nitrate contamination issue within groundwater. This specific source focuses on the Tulare Lake Basin and Salinas Valley Groundwater. *Tulare County* is an area that is found within the San Joaquin Valley. This source has provided the necessary information on groundwater contamination, specifically within the SJV. Report for the State Water Resources Control Board Report to the Legislature. Center for Watershed Sciences, University of California, Davis. 78 p.

Chambers, Tim, Jeroen Douwes, Andrea't Mannetje, Alistair Woodward, Michael Baker, Nick Wilson, and Simon Hales. 2022. "Nitrate in Drinking Water and Cancer Risk: The Biological Mechanism, Epidemiological Evidence and Future Research." *Australian and New Zealand Journal of Public Health* 46 (2): 105–8. https://doi.org/10.1111/1753-6405.13222.

This source provided information to explain the issue surrounding water contaminants effectively. It tied the risk of cancer in with our metaphor, blood pressure. This source portrays how groundwater contamination is harmful by linking it to several cancer risks. This relates to our audience because the SJV experiences this water contamination first-hand.

"2022 Drinking Water Needs Assessment Executive Summary". State Water Resource Control Board. Regional Water Resources Control Board. 2022.

https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/needs/022NAexecutivesummary.pdf

This source was taken from the Community Water Center for the advocacy of the San Joaquin Valley community.

Hanak E, Escriva-Bou A, Gray B, Green S, Harter T, Jezdimirovic, J, Lund J, Medellín-Azuara J, Moyle P, Seavy N. 2019. Water and the Future of the San Joaquin Valley - Public Policy Institute of California. https://www.ppic.org/publication/water-and-the-future-of-the-san-joaquin-valley/.

This 100-page report provides a detailed account of the water challenges in the San Joaquin Valley and reviews the most promising approaches and solutions to these issues. It focuses on the balancing of water supplies and demands, as well as groundwater quality challenges, which are the main topics of our communication piece. This research was done by the Public Policy Institute of California, which aims to inform the public through "independent, objective, nonpartisan research" to improve public policy.

GreenLatinos. 2020. Water Equity. GreenLatinos. https://www.greenlatinos.org/clean-water.
GreenLatinos is known as an advocacy group that supports strong water and gives resources in order to build infrastructure. In addition, GreenLatinos supports water accessibility programs. This source has been extremely useful in researching known solutions to our water issue. In addition, it provides us with a tool to use for new, innovative solutions.

La Asociación de Gente Unida por el Agua. AGUA Coalition. https://www.aguacoalition.org/

The AGUA Coalition is a grassroots organization that impacts Latine communities within the San Joaquin Valley. The AGUA Coalition has provided us with information on how policy-based solutions are effective. In addition, it has given us tools to create our own solutions by building off of their ideas. The AGUA Coalition members work to advance safe drinking water projects through making policy decisions.

“San Joaquin Valley.” n.d. Community Water Center. Accessed October 23, 2022. https://www.communitywatercenter.org/sjv.

We chose the Community Water Center as a suggested advocacy group to donate to, as well as a trusted communicator to promote our communication toolkit. Their programs, such as the Community Water Leaders Network, support local water-decision makers that
advocate for drinking water issues in their communities, providing resources and information and building grassroots power. Their Safe Water Projects fund consolidation projects of small water systems, water treatment, and feasibility studies.

NON-ANNOTATED BIBLIOGRAPHY

Balazs CL, Ray I. 2014. The Drinking Water Disparities Framework: On the Origins and Persistence of Inequities in Exposure. American Journal of Public Health.

104(4):603–611. doi:10.2105/ajph.2013.301664.

Ray I, Balazs C, Hubbard A, Morello-Frosch R. 2011. Social Disparities in Drinking Water Quality in California's San Joaquin Valley. NASA ADS. 2011:H13J03. [accessed 2022 Oct 24]. https://ui.adsabs.harvard.edu/abs/2011AGUFM.H13J..03R/abstract.

Vaughan M, Vera N. 2020 Dec 11. Toxic tap water in Latino towns is a legacy of racist policies, California officials say. The Fresno Bee. https://www.fresnobee.com/fresnoland/article247571190.html.

Proactive Communication Branch. 2012. Cultural Insights: Communicating with Hispanics/Latinos. Centers for Disease Control and Prevention. https://www.cdc.gov/healthcommunication/pdf/audience/audienceinsight_culturalinsights.pdf.

Dave Metz, Curt Below & Miranda Everitt Fairbank, Maslin, Maullin, Metz & Associates. California Safe Drinking Water Survey Results. 2017 January. https://d3n8a8pro7vhmx.cloudfront.net/communitywatercenter/pages/996/attachments/original/1502155160/California_Safe_Drinking_Water_Memo_-_Final.pdf?1502155160

Tackling Safe Drinking Water in the San Joaquin Valley. Public Policy Institute of California. 22 October 2018. https://www.ppic.org/blog/tackling-safe-drinking-water-in-the-san-joaquin-valley/.

DROUGHT AND THE WATER DISTRICT

California has suffered droughts recorded back to the 1920s

The state and local governments of Orange County have mandated a reduction in domestic water usage and placed restrictions on certain water consuming activities.

Enforcement on these mandates

With Orange County spanning almost 1000 m², enforcing water conservation manually has become an issue of time and personel. There are not enough enforcement officers to guarantee regulations are followed.

Effects of enforced water regulations

While residential usage of water only comprises about 10% of all water used, it is still important to conserve. Fining and enforcing regulations will only reduce trust in the water district and create contempt.

THE KEY IS COMMUNICATION

Districts should target their drought messages differently based on the customer's socioeconomic demographics. For example, commercial sites, businesses, and public agencies can convert irrigation to rely on recycled water. Single-family homes with large yards in wealthy neighborhoods can convert their grass to drought-tolerant landscaping. Apartments and low-income communities might consider rebates for an efficient toilet or clothes washer.

Drought is a very broad topic, so it is easy to brush it off. It will be very effective to emphasize the drought in a personal manner and provide tactical solutions for everybody while also recognizing that individuals can only do so much, and the larger issue is climate change.

Water Districts

The purpose of this toolkit is to educate water providers on how to incorporate framing methods into their communication with customers to enhance its effectiveness.

Audience

- The audience will be the water districts of Southern Orange County and all of the employees running them. This includes office employees, customer support, and field workers.
- Most, if not all, employees are college educated, as many positions within the water district require, at the bare minimum, a bachelor's degree (usually in engineering, data, and environmental science and policy). This limits our demographic to those who can actually afford college.
- Because water district workers are college educated, they will also most likely fall under the category of middle-class socioeconomic status. The middle class is characterized by ambition, hard work, thriftiness, and political activism. They also are known to have progressive values that contribute to economic growth (Chun et al., 2010).
- They typically do not face any environmental hazards where they live and have sufficient access to clean drinking water. Most Orange County residents, especially those employed at a water district, are privileged.
- The majority of water district employees should be environmentally inclined, eager to entertain new possible sustainability ideas, and passionate about the topic of water conservation from a professional and personal standpoint. This won't be the case for everyone, but conserving water and reducing waste heavily benefits the water districts as well as the environment. This is an important element that allows for smooth communication and maximized cooperation from both sides.
- Orange County is one of the less ethnically diverse areas in Southern California, with a majority of residents being non-Hispanic white, except in some places such as Irvine, where Asians also contribute an extremely large fraction of the population. For this reason, water district employees will be mostly comprised of white and Asian-descended people. They may hold progressive ideals about eliminating environmental racism and a drive to better county-wide infrastructure (and are doing so through the water district).
- Water districts serve as the link between the public and the government and are impacted by the drought in numerous ways. As state and local watering mandates come through, agencies are responsible for enforcing them to their customers. Water district employees will have to follow through with government mandates whether they entirely trust them or not, but are more likely to understand and trust data backed by scientists.
- Additionally, the secondary audience will also include customers of the Southern Orange County water districts who utilize and pay for water for domestic and commercial use. Because these individuals will be the ultimate recipients of the values, we are advocating for. The water district is composed of ordinary citizens, so they will share most values in common. However, customers of the water district may not be as trusting of government mandates and scientists or have an inclination towards sustainability. They should,

however, trust the water district that supplies them water, at least enough to internalize their suggestions.
- This communication piece will be shared in offices and the workplace; therefore, it should be professional and concise. It might also reach employees through email or other online communication, and their messages will ultimately be passed to customers through online media and fliers.

Value

- As a trusted water provider for millions of residents, businesses, and more, water districts serve as a connection between the public and the government and should therefore value responsible management.
- The largest issue facing water districts in the greater Orange County area is Southern California's extreme drought. Responsible water management is critical for protecting the health of our community. Being responsible includes considering the resources available, maintaining them at a steady rate, and concentrating on effective solutions to the problem. We believe using natural resources responsibly is key; future generations will benefit from actions taken to address the environmental issues we are currently facing.
- Valuing responsible management avoids individualism. Believing that nature works in cycles and will eventually fix itself is detrimental. If these fatalist values trickle down from water district managers to individual customers, the issue will worsen. However, when water agencies stress the importance of conservation, their customers will follow in that direction, making it easier to implement solutions.
- According to the University of New South Wales, responsible management "ensures businesses make a positive and sustainable impact." Approaches that are realistic and doable enable us to promote conservation at every step. It is vital to protect and share our resources with the community through education, policy leadership, and employee involvement (L, 2022).
- The United Nations Global Compact also supports this value and even created an initiative called Principles for Responsible Management Education–PRME. The purpose of the initiative is to advance education in sustainable governance. It has gained many signatures and proven effective in emphasizing 'ethics, sustainability, and the global marketplace (Godemann, 2014). Although the PRME is more business-oriented, the same principles can apply to water districts. By taking care of issues before they worsen, we can make a difference.
- When water districts value responsible management, they dedicate themselves to providing, conserving, and maximizing the efficient use and reuse of water and renewable resources to benefit their customers and enhance the environment.

Metaphor

- Drought in Southern California is not a new phenomenon. Southern California primarily sources water from the State Water Project, or SWP, and the Colorado River basin, along with local groundwater reservoirs, recycled water, and more. The SWP transports

water from the Sierra Nevada snowmelt to Southern California through 700 miles of pipelines and canals. It provides water for 27 million Californians and 750,000 acres of farmland (ACWD). The Colorado River basin supports water for over 3 million acres of farmland across seven states in the U.S. and Mexico (Barnett, 2009). Streamflow in both sources is drastically decreasing due to anthropogenic climate change. As humans burn fossil fuels such as coal, oil, and natural gas for fuel, carbon dioxide, and other gasses are released and trapped into the atmosphere, like a thickening blanket warming the Earth (NNOCCI 2016). At such a rampant rate, greenhouse gas emissions contribute to higher temperatures, lower soil moisture, and more extreme weather conditions overall.

- Rainfall in the Sierra Nevada mountains and Colorado River headwaters experience negative precipitation compared to the historical records. California has a remarkably variable hydroclimate, with larger year-to-year precipitation variations than elsewhere in the U.S. Standard deviations of annual precipitation are between 30% to 50% of long-term averages (Dettinger, 2014). Consequently, California is facing the most extreme drought in history (Diffenbaugh, 2015). Both of Southern California's leading potable water sources are drastically decreasing. If greenhouse gas emissions are not slowed, conditions will worsen, like a small hole in your sock growing larger over time if not sewn right away.
- According to Stevie Anscombe, "socks can be used as a metaphor for all of life" (Anscombe, 2016) Everyone wears socks and has likely experienced the dreadfulness of having a small hole in their sock. It seems like something you can put off, but as the hole grows and gets more annoying, it becomes something that needs urgent attention. We believe that water district employees have felt this before and will see drought this way. The water district can also use this metaphor in communication with customers for an improved understanding of the issue.
- We created this metaphor, so it is not tested, and there are few sources to back it up. However, we believe that it is effective because it is relatable and engaging to almost everyone.

Explanatory Chain

- Throughout this toolkit, we articulated the specific structure of the explanation in a linear fashion. Using steps in communication pieces is proven to be the most effective (Sutiyatno 2018). We are building upon the water districts' previous knowledge of drought. By adding a new outlook and providing a value, metaphor, and solution, we can avoid communication traps. Furthermore, we avoided the swamp by promoting themes that science is innovation, humans are problem solvers, and we have civic responsibility. Using these frames promotes positive thinking and outcomes (NNOCCI 2016). With the metaphor, we began by explaining the context and science of drought. Following explanatory chains, the metaphor was the last sentence. We ensured to include more logical steps than thought necessary because we know climate change science but the audience might not. Water district employees have diverse backgrounds, and not everyone has studied environmental science. We also made sure to constantly refer to the big picture to remind the audience of our main goal.

Solution

- Drought is ultimately an effect of climate change that is out of the control of both local government and individuals, but the consequences of drought can be alleviated by conserving the usage of water.
- Emphasis needs to be placed on limiting the wasteful use of potable water; there are strict enforcements in place to accomplish this, but no solid methods of legally enforcing them upon the general population. There is neither the time nor personnel to actively manage the water usage of domestic households, and the consequences of doing so are diminishing trust and growing contempt of water district customers, who pay for the water and are being punished over the industry, which on average wastes more water than domestic users.
- Water districts are given guidelines from the municipal water district about rebate programs but are encouraged to create their own. Rebate programs include removing grass and installing drought-resistant landscaping, converting from spray heads to drip irrigation, weather-based irrigation controllers, purchasing rain barrels, and more. As the drought worsens, these rebates, along with other efforts, will be exhausted. Overall, more stress will be placed on water districts to limit their customer's water use (CA Waterboards 2022).
- As a trusted source, water agencies should also be providing their customers with practical ways to be water efficient. Some water districts have large service areas that cover a wide range of communities.
- The most effective and viable ways of saving water are through active communication with the customers of the water district. Appealing to their values and perspectives, tailoring a purposeful message to their customers, to get them to follow regulations of their own volition, without legal enforcement.
- Districts should target their drought messages differently based on the customer's socioeconomic demographics. For example, commercial sites, businesses, and public agencies can convert irrigation to rely on recycled water. Single-family homes with large yards in wealthy neighborhoods can convert their grass to drought-tolerant landscaping. Apartments and low-income communities might consider rebates for an efficient toilet or clothes washer. Drought is a very broad topic, so it is easy to brush it off. It will be very effective to emphasize the drought in a personal manner and provide tactical solutions for everybody while also recognizing that individuals can only do so much, and the larger issue is climate change.
- To best incorporate these ideas, water districts should hire professionals in environmental communication and should hold seminars to train employees on how to best interact with customers. Employees should be savvy about the values of customers enough to navigate the concerns around drought and water conservation and best convince customers to follow regulations.

Works Cited

Anscombe, Stevie. “I Find That Socks Can Be Used as a Metaphor for All of Life.” *Medium*, Medium, 14 May 2016, https://medium.com/@stevielairdofkincavelanscombe/i-find-that-socks-can-be-used-as-a-metaphor-for-all-of-life-c2ce983687a7.

Barnett, Tim P., and David W. Pierce. "Sustainable water deliveries from the Colorado River in a changing climate." *Proceedings of the National Academy of Sciences* 106.18 (2009): 7334-7338.

Chun, Natalie, Deolalikar, Anil B. “Who are the Middle Class and What Values Do They Hold? Evidence from the World Values Survey”. Asian Development Bank (2010). https://think-asia.org/handle/11540/1566

Dettinger, Michael, and Daniel R. Cayan. "Drought and the California delta—A matter of extremes." *San Francisco Estuary and Watershed Science* 12.2 (2014).

Diffenbaugh, Noah S., Daniel L. Swain, and Danielle Touma. "Anthropogenic warming has increased drought risk in California." *Proceedings of the National Academy of Sciences* 112.13 (2015): 3931-3936.

Godemann, Jasmin, et al. "United Nations supported principles for responsible management education: Purpose, progress and prospects." Journal of Cleaner Production 62 (2014): 16-23.

L, Chloe. “Why Is Responsible Management Important?” *UNSW Sites*, 29 July 2022, https://www.unsw.edu.au/news/2022/07/why-is-responsible-management-important#:~:text=Responsible%20management%20is%20the%20commitment,a%20positive%20and%20sustainable%20impact.

National Network for Ocean and Climate Change Interpretation - NNOCCI (2016). Changing the Climate Conversation: All NNOCCI Reframe Cards. https://climateinterpreter.org/content/changing-climate-conversation-all-nnocci-reframecards

Sutiyatno, Sukris. "The effect of teacher's verbal communication and non-verbal communication on students' English achievement." *Journal of Language Teaching and Research* 9.2 (2018): 430-437.

The State Water Project Frequently Asked Questions - ACWD. https://www.acwd.org/DocumentCenter/View/3072/SWP-FAQ-111919.

The Irvine, California Population 2022 - World Population Review
https://worldpopulationreview.com/us-cities/irvine-ca-population

Annotated Bibliography

Jacqueline Aenlle, Laura A. Sanagorski Warner. “BEST PRACTICES FOR COMMUNICATING ABOUT OUTDOOR RESIDENTIAL WATER CONSERVATION” University of Florida IFAS Extension (2020) https://edis.ifas.ufl.edu/publication/WC366

- This source lists specifically types of communication practices that have proven effective in communicating water sustainability, including the understanding of your audience and tailoring a purposeful messaging specifically to their values and perspectives. This source is not only extensively researched but well formatted and combines data from several other studies.

Water Conservation Portal - Emergency Conservation Regulation | California State Water Resources Control Board. (n.d.). Retrieved October 17, 2022, from https://www.waterboards.ca.gov/water_issues/programs/conservation_portal/regs/emergency_regulation.html

- This source details all of the temporary water usage restrictions on Californians, it changes as mandates from the state differ from month to month. The portal lists all restrictions and requirements as well as enforcement methods, and why they should be followed. The problem with these is that they are not enforceable on a large scale community such as Orange County, and the way they are communicated isn’t effective. Essentially, this is an example of how communication with water district customers is important and in this case, how they are failing to utilize tailored communication to drive people to follow regulations without legal enforcement.

Water Availability for Central Valley Dairies

Importance of Groundwater

Water scarcity occurs when water usage exceeds water availability. Due to California's fickle climate, prolonged droughts are frequent.

Dairy farmers rely heavily on water, largely sourced from groundwater, to produce feed crops, wash milking equipment, clean waste, and prevent milk spoilage, among other uses.

142 million gallons
of water per day are used for California's dairy cows.

Current Impacts

Aquifers, the underground basins that hold water, act like **a bank account.** When more money is taken out than is deposited, there is a deficit. Similarly, when more water has been removed from the ground than has been returned, a groundwater deficit occurs. Much like overdraft fees, the consequence of a deficit of groundwater is a reduction in the ground's capacity to store water.

Groundwater in California's Central Valley has become over-extracted and polluted during a historical absence of groundwater regulation in the state. **Responsible management** of this resource is important to ensure its continued availability and to protect the health of Central Valley families and community members.

Potential Solutions

Groundwater Recharge

Water from floods or rain can be captured and stored in the aquifer for future use. This method slows down the water depletion rate and increases the water available during shortages.

Water Filtration: Vermifiltration

Vermifiltration is an affordable and accessible water filtration method in which contaminants are removed by worms and an additional sand filter.

Water Recycling

Filtered water can be reused on the farm multiple times before being returned to the ground, increasing efficiency and reducing the need for additional extraction.

Dairy Farmers

Audience and Setting:

Our target audience is dairy farmers in California. The communicator is water conservation groups, non-profit organizations, and other environmental groups. The setting where this communication piece would be used is Central Valley, specifically Tulare County where dairy farmers are most concentrated in California. Our audience is made up of 67% male and 33% female who are mostly white and at an age above 40. Their trusted communicators are other dairy farmers, their family, friends, and political leaders that align with their perspective. 99% of dairy farms are family-owned, making them family and local centric. Water scarcity is a huge issue in California because of the high demand for water in summer and little natural precipitation and snowfall. California's fickle climate makes the state susceptible to extreme droughts and floods. Dairy farmers are impacted by water scarcity because their farms heavily rely on large amounts of water to operate, including for drinking, growing feed, and sanitation for their cattle. Limited water availability causes limited dairy production, which hurts the farmers and adds financial stress. This communication piece is specifically tailored to dairy farmers in California's Central Valley, taking their cultural values and background into account to help them understand their place in the ongoing water issue and empower dairy farmers to implement water conservation practices along with other ways to sustain their business.

Values:

While not a monolith, nearly all (99%) California dairy farms are family owned. They share values relating to the importance of family and community, and respect the importance of responsible management of resources to protect future generations and current community members. They value their land and the well-being of their cows, as well as tradition and family legacy. They also value the development of their businesses and are committed to maximizing profit and maintaining economic sustainability.

Central values:

- Business development
- Taking care of their farm and their cows' well-being
- Family life
- Community wellbeing
- Profit and economic sustainability
- Tradition and legacy

Metaphors:

Dairy farmers have relied on groundwater resources for the success of their businesses for generations. While they have an understanding that the groundwater level has been lowering, and have adapted by drilling deeper wells, the concept of over-pumping limiting the capacity of the ground to hold water in the future is complicated, especially for those who lack surface water access. Using the metaphor of a bank account for an aquifer makes this concept more accessible, and successfully conveys the ideas of faster extraction than replenishment as well

as of subsidence resulting in basin capacity reduction. This metaphor is understandable by this audience as, at its core, a dairy farm is a business. Two additional metaphors that focus on the disparity between extraction and refill have also been provided.

Primary metaphor:

- *Aquifer as a bank account:* An aquifer is like a bank account. When more money is taken out of the account than is going back in, there is a deficit, and the account holder is required to pay overdraft fees. This is the same concept as what happens with water in the aquifer underneath the central valley: more water has been removed from the ground than has been returned to it, and the groundwater deficit has resulted in a reduction in the ground's capacity to store water.

Alternative metaphors:

- *Aquifer as a sponge:* An aquifer is like a sponge that, once full of water, has been wrung out by continual extraction without being refilled.
- *Aquifer as a glass of water with many straws (wells):* An aquifer is like a glass of water with many straws. When the straws all take up too much water without the glass being refilled, eventually no straws will be able to drink.

Explanatory chain:

1. Groundwater in California's Central Valley, as a major component of the dairy industry that predominates the area, has become over-extracted and polluted from a historical lack of groundwater regulation in the state. The way this crucial resource is used now faces a significant transition to ensure its continued availability for use.
2. Dairy farms in the Central Valley are primarily family-owned. To protect the livelihoods of these dairy farmers and the health and well-being of their families, community members, and future generations, groundwater resources must be responsibly managed.
3. Groundwater is stored in underground basins, or aquifers, and is brought to the surface for human use by wells and pumping. An aquifer is like a bank account. When more money is taken out of the account than is going back in, there is a deficit, and the account holder is required to pay overdraft fees. This is the same concept as what happens with water in the basin underneath the Central Valley: more water has been removed from the ground than has been returned to it, and the groundwater deficit has resulted in additional costs, namely a reduction in the aquifer's capacity to store water.
4. The Central Valley's groundwater resources have been depleted from over-extraction and polluted from high concentrations of nitrates sourced from manure and fertilizers. As a multi-part issue, solutions must be equally and appropriately scaled. The solutions proposed address multiple parts of the issue: lowering groundwater levels, increasing groundwater pollution, and inefficiency of each drop of water used.

Solutions:

The main problems that cause scarcity of clean water within the Central Valley are the overpumping of groundwater and water contamination. When the amount of water usage

exceeds water availability, we are in a deficit. Not only is the amount of water a concern, but so is the suitability of that water's quality. Dairy farming, through the use of fertilizers and manure to aid the growth of feed crops, may result in contamination of the water supply and subsequent effects on human health. Some plausible solutions which are achievable on a community level of action and approachable by individuals in the dairy industry include groundwater recharging and contaminated water filtration for multiple reuses. An affordable and accessible option for water filtration is vermifiltration. Dairy farmers rely heavily on water from aquifers to support their businesses, but the mass amount of pumping has depleted the aquifers, intensifying competition for water among the agricultural community and local citizens in the Central Valley. Therefore, strategizing water distribution and storage is crucial in sustaining the water supply for dairy farmers. Groundwater recharge is when flood water is captured and stored for future use. This adds "deposits" into their "bank accounts," replenishing groundwater. Nitrate contamination is common in dairy farms and poses health risks to their local communities who access the same water resources, making filtering contaminated water an important step. Not only will farms be able to reuse the filtered water, this process also decreases the chance of developing health issues from ingesting nitrates. Vermifiltration applies on the scale of individual farms. The process begins with wastewater from farms being pumped into worm beds. The worms remove harmful chemicals and nutrients from the water, after which the water filters through crushed rock, resulting in clean water that exits the worm bed and passes through pipes to be reused on the same farm. This solution is intended for farmers looking for a low cost, accessible method of reusing the same water multiple times. Filtering water for reuse around the dairy increases the efficiency of each drop of water and lowers the need for additional water extraction prior to the water being returned to the earth.

Annotated bibliography:

<u>Values:</u>

Hansen, B. G., & Greve, A. (2014). Dairy farmers' values and how their values affect their decision. *Agricultural and Food Science*, *23*(4), 278–290.

This source investigated how the values of dairy farmers affect their decision-making. In 2007, the authors interviewed 90 dairy farmers and generated qualitative data. Then, they merged it with financial data from the same year to do a statistical analysis. The results show that dairy farmers hold terminal values and instrumental values. Terminal values include maintaining tradition and having interesting work. This is combined with their instrumental values to produce milk to earn money. Value is important to take into account when communicating with our audience because by knowing their background and what is important to them, we can make them feel seen and understood.

Wilmes, E., & Swenson, R. (2019). Engaging dairy farmers in safety messages: Values, moral norms, barriers, and implications for communication. *Journal of Applied Communications*, *103*(1).

This source conducts qualitative research in exploring effective communication strategies that support safety and health practices by employees and farmers. Their findings include four values and moral norms that are important to dairy farmers and how these values translate into how farmers engage in communication. Values include confidence and pride in their own expertise, being a good role model, and the protection of their employees, investment, and business. By understanding the important values that dairy farmers hold, we can tailor our communication strategies in order to gain their trust and communicate effectively with them.

Metaphor:

> Charles, D. (2021, October 7). *New protections for California's aquifers are reshaping the state's Central Valley.* NPR.

This article discusses the impacts of the Sustainable Groundwater Management Act (SGMA) in the Central Valley and features a quote from Rick Cosyns, a farmer near the town of Madera. In talking about his efforts to replenish the groundwater below his farm to prepare for years with drier conditions, and how the water level continues to decrease from the pumping of other farms, he refers to his actions as “investments” and says that the other farmers have been getting into his “bank account” that he has “saved for.” This use of the same metaphor by a farmer himself supports the idea that this is an accessible way of thinking about the aquifers by an audience of farmers.

> Howitt, R., Medellín-Azuara, J., MacEwan, D., & Lund, J. (2014, July 15). *Weathering the drought by drawing down the bank*. California WaterBlog.

This blog post, announcing a report from UC Davis on the effects of drought upon California agriculture, uses the bank account metaphor for aquifers, but in a slightly different way. Richard Hewitt, the primary author of the report, explains that the aquifer must be used like a “reserve bank account,” explaining that its storage quality can be a great strength if used responsibly. The use of this bank account metaphor for an aquifer by multiple parties suggests that this has been accepted as a valuable way of conveying their function to many different audiences, including dairy farmers who have picked up this story in their own media, including AgProud.

Explanatory Chain:

> Bjerga, A. (2022, September 12). *California Water Crisis Challenges Dairy, Vanden Heuvel says*. National Milk Producers Federation.

This interview of Geoff Vanden Heuvel, who acts as the director of regulatory and economic affairs for the Milk Producers Council in California, brings up groundwater as the most pressing issue for dairy farmers at the present time. He addresses how groundwater has historically lacked regulation in California, and how the introduction of regulation through SGMA looks in

terms of changing practices for dairy farmers. Understanding this precedent is crucial to understanding and addressing present and future issues.

> Moore, E., Matalon, E., Balazs, C., Clary, J., Firestone, L., De Anda, S., & Guzman, M. (2011, March). *The human costs of nitrate-contaminated drinking water in the San Joaquin valley*. Pacific Institute.

This study looks into the extent of nitrate contamination within the San Joaquin Valley and its associated effects on human health as well as local economics. The findings of the paper include a disproportionate effect of the nitrate contamination on low-income and Spanish-speaking members of the community. The environmental justice aspect of this issue makes it important to press that the actions of farmers in cleaning the water they use are beneficial not only to their business but to the protection of their families and other members of their community. This highlights the values of family, community, and public health.

Solutions:

> Charles, D. (2021, October 5). *Water is scarce in California. but farmers have found ways to store it underground*. NPR.

This source talks about how the 15-acre sunken field in Tulare County is the key to survival for the agriculture community. Farmers found a way to combat the water shortage by transforming this basin into rainwater storage. When rain swells the river, farmers can open the gate and let the water run through irrigation systems and into the basin. The stored rainwater can be used in the future by sinking into the ground, joining the natural aquifer system below. Although this is not a permanent solution to the water crisis, storing rainwater can slow down the depletion rate. This solution inspires the community to work together to capture rainwater during the winter when precipitation is more frequent.

> Johnson, L. (2022, June 22). *Vermifiltration as a technology for lowering dairy wastewater's nutritional and organic-strength*. Livestock and Poultry Environmental Learning Community.

Many ways of solving water scarcity are often large-scale and expensive. The author of this source conducts research on the effectiveness of vermifiltration, more specifically, how well it removes solids and nutrients in dairy wastewater. The source explains the process of vermifiltration in detail. The author observes that the vermifilter removes up to 90% of wastewater organics, nutrients, and solids. This system can also reduce greenhouse gas emissions. The research is backed by graphs and tables. This study confirms that vermifiltration is affordable, effective, and can be built both on a small scale and a larger scale.

TACKLING WATER SCARCITY
CENTRAL VALLEY, CA FARMERS

WHAT IS WATER SCARCITY?
Water is scarce whenever there isn't enough water to meet the demands of society in regard to agriculture, industry, and basic human consumption.

WHAT ARE AQUIFERS?
It's an underground layer of rock that holds water and naturally refills itself slowly . Aquifers are usually drilled into for water and most farms use them to plant their crop. It's importanrt to note that they run the risk of shrinking if they don't retain water or are refilled in time.

WHY CENTRAL VALLEY ?
Central Valley has the most over-drafted aquifers in California, with more in Fresno, Kern, and Tulare. Agriculture is most popular in these counties, signifying a direct correlation with water usage and agriculture.

WHY FARMERS?
Farmers are essential for society's economy and wellbeing, so using susaintable water and farming prractices will ensure jobs for current anf future farmers , along with a consistent food market forthe people.

WHY NOW?
Climate change is altering the intensity of natural disasters, such as drought. Aquifers will shrink and won't retain as much water due to them, so being mindful about water practices now will ensure reliable water for current and future generations.

TACKLING WATER SCARCITY
CENTRAL VALLEY, CA FARMERS

CLIMATE HEART

The oceans and the waters that run throughout the Earth are just like a heart that circulates fresh blood and regulates the body itself, as it controls the circulation of heat and clean water throughout ecosystems. Therefore, caring for our waters is extremely important to ensure that our local and non-local waters are clean and stable

SOLUTIONS

Production of crops doesn't have to lower, but being mindful of water usage and reducing harmful practices such as intensive tilling are ways that can reduce water waste and with communal efforts, will greatly impact the water scarcity issue in California.

INITIATING DISCUSSION

Discussion about water scarcity is important and some may not know how pressing this issue is, but hearing about this from other likeminded farmers may open their eyes and bring them along this journey to help the water scarcity issue.

Agricultural Farmers

Audience & Setting:

- Our target audience consists of farmers in the setting of Central Valley, California.
    - The farmers consist of different demographics but the majority are older white and hispanic farmers.
- Farmers play a major role in the water issue crisis discussion since their job uses more water than other professions, and the central valley farmers mostly participate in intensive tilling when farming, which means they most likely use unsustainable water practices as well.
    - **Trusted messengers**: Other farmers and those in authority that determine California's agricultural water regulations.
- **Cultural Values:**
    - Strong work ethic, providing for others, self-sustaining community, patience, people-oriented.
- Examples of communicators would be farmer-friendly nonprofits working towards bettering their working conditions, and trusted government officials.
    - Communication would most likely happen on a small scale, talking to them one on one or in small groups about how sustainable use of water will help in the long run in many ways, eventually getting many people on board.
- Relevance presents itself here since the audience is directly impacted by the different ways to use water, and they're the only ones that can listen to the communication piece and create change to their own practices. By educating themselves on the importance of sustainability in regards to their livelihood, the environment, and the future generations of farmers, they'll be able to become leaders and take future initiative for water conservation. The setting is relevant as well because it shows where this communication piece will take place and where it is going to be advocated. Ideally the audience and the setting will be the main listeners and receivers of the message from this communication piece.

Value:

- Responsible Management
    - Being responsible when it comes to the environment benefits a wide range of people, along with nature itself. Shifting away from the mindset to continuously take resources and profit off of them with no regards to future consequences will create positive change within the farming community.
    - Responsible managers keep an open mind, look to evidence, and take a level-headed, step-by-step approach.
    - Future generations of producers and consumers depend on the decisions made today by all the farmers,

Value Annotated Bibliography:

- Farmers for a Sustainable Future. [accessed 2022 Dec 4]. https://www.fb.org/land/fsf.
    - This source is an advocacy group that represents U.S. farmers and ranchers. There are ways provided in the source of how sustainable farming works with several graphs of evidence as well. This relates to the value of responsible management because with the water crisis in California, farmers have to have responsible management with their water. The central valley is where a majority of farming occurs which is why responsible management is important for farmers in the central valley.

- Sustainable Groundwater Management Reshapes Farming in California's Central Valley. Means and Matters. [accessed 2022 Dec 4]. https://meansandmatters.bankofthewest.com/article/financial-perspectives/industries/sustainable-groundwater-management-reshapes-farming-in-californias-central-valley/.
    - This source explains the idea of sustainable groundwater management in different cities in the central valley. This relates to the value of responsible management because groundwater is a useful resource for farming and with the water scarcity in California, having sustainable groundwater management. This source also provides statistics for the water crisis in California and how the farming land is being used.

Metaphor:

- Water is like a climate heart. The heart pumps blood throughout the body and keeps it alive the same way water regulates the climate system. If there is less water, then the heart will stop functioning off and won't be able to regulate the climate system.

Metaphor Annotated Bibliography:

- Postel SL. 2000. ENTERING AN ERA OF WATER SCARCITY: THE CHALLENGES AHEAD. Ecological Applications. 10(4):941–948. doi:10.1890/1051-0761(2000)010[0941:EAEOWS]2.0.CO;2. [accessed 2022 Oct 12]. http://doi.wiley.com/10.1890/1051-0761(2000)010[0941:EAEOWS]2.0.CO;2.
    - This source provides background information and current situations regarding water scarcity. This is connected to farmers because they are also being affected by water scarcity because they use a big portion of our water. This connects to the metaphor because the more that big users such as farmers use a majority of water, the less water we have to regulate the climate system.

- Swenson S. 2022. Agriculture's Water Challenge Is About to Get a Lot Worse. Modern Farmer. [accessed 2022 Dec 3]. https://modernfarmer.com/2022/05/agricultural-water-scarcity/.
    - This source provides information about how water scarcity will worsen for agriculture over time. This connects to farmers because a farmer's job includes agriculture which is being altered because of water scarcity. This source also

connects to the metaphor because water scarcity is affecting the “climate heart” because of the decrease of water.

Explanatory Chain:

Water scarcity has become a prevalent issue in California, and has clear correlations with the success of crops and their growth. It’s important to protect our waters not only for our beautiful ecosystems but also for our future generations. Farmers are an incredibly essential part of society's economy and wellbeing, and this country would fall into unfortunate conditions if produce and crops weren't able to be put out the way they are now. In central California, a great amount of produce is grown, but so is a lot of water from the aquifers that are there. The oceans and the waters that run throughout the Earth are just like a heart that circulates fresh blood and regulates the body itself, as it controls the circulation of heat and clean water throughout ecosystems. Therefore, caring for our waters is extremely important to ensure that our local and non-local waters are clean and stable. Using the aquifers excessively and draining them can be really dangerous since aquifers need to be filled with water or else they’ll start to shrink. The reason they can’t be filled as quickly from rain waters is because with climate change, there will be longer periods of drought.

Solutions Communication Piece:

With sustainable farming practices, there will continue to be resources to grow essential crops, keep land healthy, and keep the jobs for future and current farmers. Discussion about water scarcity is important and some may not know how pressing this issue is, but hearing about this from other like minded Production of crops doesn’t have to lower, but being mindful of water usage and reducing harmful practices such as intensive tilling are ways that can reduce water waste and with communal efforts, will greatly impact the water scarcity issue in California.farmers may open their eyes and bring them along this journey to help the water scarcity issue.

Explanatory Chain Annotated Bibliography

- Wu W-Y, Lo M-H, Wada Y, Famiglietti JS, Reager JT, Yeh PJ-F ., Ducharne A, Yang Z-L. 2020. Divergent effects of climate change on future groundwater availability in key mid-latitude aquifers. Nature Communications. 11(1). doi:10.1038/s41467-020-17581-y. [accessed 2022 Dec 3]
    - This source provides the science needed to back up the arguments that the Earth doesn’t just heal itself and there needs to be support from people to keep it maintained and healthy. Having a simple scientific explanation will aid in rebutting any claims against climate change’s effects on the water crisis. In addition to this, the values set in the explanatory chain will create a sound argument and one that people can trust.
- The Value of Explanation: Using Values and Causal Explanations to Reframe Climate and Ocean Change. wwwframeworksinstituteorg. [accessed 2022 Dec 5]. https://www.frameworksinstitute.org/publication/the-value-of-explanation-using-values-and-causal-explanations-to-reframe-climate-and-ocean-change/.

- This source provided insight in stating that the value of responsible management was really effective for discussing climate change along with trying to change systemic issues, such as the one being addressed with water scarcity and farming. This source further reinstates the fact that facts and numbers won't do any good if people don't feel drawn to help and support the fight against the water crisis. This source assisted in setting up various values throughout the explanatory chain.

Solutions Annotated Bibliography:

- USDA ERS - Soil Tillage and Crop Rotation. wwwersusdagov. https://www.ers.usda.gov/topics/farm-practices-management/crop-livestock-practices/soil-tillage-and-crop-rotation/#:~:text=Tillage%E2%80%94turning%20the%20soil%20to.
    - This source provided feasible solutions to water usage, such as lowering the intensity and frequency of soil tilling. This would also benefit the farmers since their soil would be able to retain more water and not erode from factors such as wind, allowing their crops to grow more efficiently. Not only is this better for the environment but it would use less water without reducing production or cutting off supplies.
- The Value of Explanation: Using Values and Causal Explanations to Reframe Climate and Ocean Change. wwwframeworksinstituteorg. [accessed 2022 Dec 5]. https://www.frameworksinstitute.org/publication/the-value-of-explanation-using-values-and-causal-explanations-to-reframe-climate-and-ocean-change/.
    - Looking back at this source, on page 4 in the introduction it states "Without a value, people struggle to see the point of engaging with an issue and frequently fall back on individualistic solutions to social issues". This ties into trying to normalize discussion around climate change amongst farmers to farmers, since talking about tough topics may be easier when someone who shares a common identity talks about it.

Hotel & Restaurant Owners

Target Audience:

My target audience is southern California hotel and restaurant owners. Therefore, the audience is generally made up of majority white business owners in the hospitality industry who can improve their businesses when it comes to sustainable water consumption. They tend to trust people that are interested in catering toward their economic gains which makes water issues more difficult to get across to them, but not impossible. Business owners make their living off of their restaurants or hotels which means that they also rely on their customers to support their mission. By connecting economic benefits to conserving water, I hope to address the role that hospitality plays in water scarcity in southern California.

Strategic Framing Piece:

Value Communication Piece:

With the constant stream of water running through our faucets, water, on its face, seems like an infinite resource to us humans. But as we take a closer look at where it comes from, we will find that water is in fact a scarce resource and is becoming an increasingly limited resource to many areas around the globe. This is a result of mismanaged human activity that has depleted our water reserves faster than it can be recharged.

Rivers, lakes, groundwater, etc are essential for the survival of all life on Earth. When they are depleted of water, the plant and animal life cannot survive and ecological habitats will be out of balance. These ecosystems are very valuable to us because they provide many essential services to our communities. For example, some ecosystems protect communities by absorbing their impact and preventing major floods in the wake of a disastrous event.

The water cycle requires a balance of precipitation, evaporation, and everything in between, in order to support the Earth. As the planet's average surface temperature increases and more extreme weather patterns have developed as a result of human activity, water scarcity is becoming more of an issue for the entirety of the planet, especially in drier climates such as southern California.

Living in and operating out of large cities that tend to be significantly more diverse but more consistently environmentally progressive, may make targeting water issues from a business perspective easier than dealing with a larger geographic range. Restaurant owners in Southern California especially, are more likely to be people of color than in other areas of California. Race and ethnic background are also important when considering the values of the business and how likely they are to shape their business model around environmental ethics.

We can reduce the water bills and cost of running a business/restaurant by being more conscious about water consumption. By finding solutions to prevent wasting excessive water, we can help create a more sustainable and long-lasting business that consumers can visit and will more likely want to support in the long run. Hospitality businesses are oftentimes the foundation of communities because they serve as places that unite people and create unique communities of people in society. Through the sharing of meals and experiences, people

perceive hospitality as safe and positive settings. Therefore, it is important to create a business that can be maintained to be economically efficient. The water crisis needs urgent attention and hospitality industries can be a major actor in uplifting this movement. A restaurant can waste somewhere between 3,000 and 7,000 gallons of water a day. As such, it is crucial for these businesses to take action to cut down the gallons of water they waste on a daily basis as it would not only be more sustainable, but also more cost efficient. By doing so, businesses can successfully continue to bring their communities together and be a go-to place to visit for generations to come.

Annotated Bibliography of Value:

1. *Why All Businesses Should Embrace Sustainability & How They Can Do It*. 19 Aug. 2022, https://www.imd.org/research-knowledge/articles/why-all-businesses-should-embrace-sustainability/.

This source was valuable in my understanding of businesses and more specifically, what values businesses hold. Since sustainability is significant to the project, I needed to find a way to link it to their purpose and somehow incorporate these changes into their agenda. This piece helped to understand values such as the long term success of a business as well as the social importance they emphasize.

2. US EPA, OA. *Climate Impacts on Water Resources*. https://19january2017snapshot.epa.gov/climate-impacts/climate-impacts-water-resources. Accessed 5 Dec. 2022.

This source from the EPA is a credible government resource that discusses the water cycle and the ways in which climate change impacts the cycle. It went into details about the way we source water and how water quality can be affected by environmental shifts. This really helped me frame the ecological value that water holds as well.

3. *Hotel Water Consumption Statistics & Conservation*. (2021, September 1). Pure Blue Sustainability. https://purebluesustainability.com/hotel-water-consumption-statistics-conservation/

This source provides statistics about water conservation. I was able to take a lot of the information provided and apply it to the values that correlate with hotel owners. While it isn't incredibly reliable due to the lack of research they directly did, they used sources that were credible and often referred to academic studies. Overall, the information presented helps to create a basis for the argument.

Metaphor Communication Piece:

Water scarcity can be understood like Halloween candy. Say there is a big bowl of candy on someone's front porch. If a few people decided to take three handfuls of candy each, there would not be enough left for everyone else that is trick or treating. However, if each person took one candy, there would be plenty of candy to go around for everyone and future visitors to come. Therefore, like the bowl of Halloween candy, water is a limited resource. Due to climate impacts and the unsustainable use of water, water is more scarce than it necessarily

needs to be. There is enough to support the entire planet if we all use water more discerningly. We can do so by putting conservation systems in place that reduce water use on a community-wide level to tackle this global issue.

Annotated Bibliography of Metaphor:

4. *Tragedy of the Commons | Sustainable Environment Online*. https://www.sustainable-environment.org.uk/Earth/Commons.php. Accessed 5 Dec. 2022.

This source discusses what the tragedy of the commons is and is incredibly relevant to the water issue. The tragedy of the commons is a phenomena that is witnessed in many scenarios including water sources that become exploited by humans. It gave an example of a pasture that is depleted by a farmer. If all of the nutrients are taken, the farmer may have got the profit or gains they wanted but no one can use it in the future now, including the farmer.

5. *Tragedy of the Commons: Examples & Solutions | HBS Online*. https://online.hbs.edu/blog/post/tragedy-of-the-commons-impact-on-sustainability-issues. Accessed 5 Dec. 2022.

This source also discussed what the tragedy of the commons is thoroughly. It also helped me connect my water issue to it more directly because it gave an example of how water scarcity can be a prime example of it. It also highlights how accountability is a big issue with the tragedy of the commons and how overconsumption can be avoided.

Explanatory Chains Communication Piece:

Water scarcity is exacerbated not only due to us using so much water, but also because of the climate impacts that the water cycle is enduring. A warmer planet affects our water supplies because it increases the rate of evaporation. This means that more water is being released into the atmosphere which forces the atmosphere to store a higher volume of water. As a result, this leads to more extreme droughts in some areas while other areas receive excessive rainfall.

In California, we can find fresh water in the form of groundwater and surface water. The state has faced countless droughts throughout history but none have been as extreme and prolonged as the drought we have experienced in the past few decades. As climate impacts such as these extreme droughts become more frequent, groundwater and surface water evaporate faster than ever before and are not being replenished due to the lack of precipitation.

The melting of glaciers due to the warming planet leads to rising sea levels. Because California is a coastal state, sea level rise can create significant impacts. As the ocean water continues to erode the coastal ecosystems and infrastructure, the climate impacts our water sources in many other ways. First, rising sea levels lead to salt water creeping up and contaminating surface water reserves. Additionally, salt water intrusion can be caused by salt water seeping into groundwater and degrade the quality and drinkability of the water. This leaves less freshwater available for us and can lead to other serious issues such as the inability for farmers to grow their crops that rely on aquifers to support their farm.

Annotated Bibliography of Explanatory Chains:

6. *Saltwater Intrusion: A Growing Threat to Coastal Agriculture | USDA Climate Hubs*. https://www.climatehubs.usda.gov/hubs/northeast/topic/saltwater-intrusion-growing-threat-coastal-agriculture. Accessed 5 Dec. 2022.

This source is by the US Department of Agriculture and it discusses salt water intrusion which is something very relevant to the topic. It provided me with credible information that would explain how rising sea levels affects water availability. Additionally, the illustration of salt water intrusion helped me to understand and explain how it works and why climate change is so urgent.

7. Vitousek, Sean, et al. "A Model Integrating Longshore and Cross-Shore Processes for Predicting Long-Term Shoreline Response to Climate Change: CoSMoS-COAST." *Journal of Geophysical Research: Earth Surface*, vol. 122, no. 4, 2017, pp. 782–806, https://doi.org/10.1002/2016JF004065.

This article is by the California's Legislative Analyst Office which provides information about the ways in which climate change poses a threat to California. It, more so, gave me insight on water scarcity and how I can explain the way it connects with climate change. Details such as coastal flooding and erosion, as well as issues with groundwater all are illustrated and discussed here as well.

8. Woodhouse, C. A., Smith, R. M., McAfee, S. A., Pederson, G. T., McCabe, G. J., Miller, W. P., & Csank, A. (2021). Upper Colorado River Basin 20th century droughts under 21st century warming: Plausible scenarios for the future. *Climate Services*, *21*, 100206. https://doi.org/10.1016/j.cliser.2020.100206

This study provided a comprehensive understanding of one of southern california's main sources of water. It also reflects on some scientific predictions they have for the colorado river basin. It was very credible and presented the direct results of their study. Overall, I was able to emphasize how water scarcity is so urgent by analyzing this study.

9. *Water scarcity. - EBSCO*. (n.d.). Retrieved October 15, 2022, from https://discovery-ebsco-com.libproxy.chapman.edu/c/wnnu3f/viewer/html/f4gftctc7j

This is an academic paper that analyzes the topic of water scarcity and how that pertains to us. Freshwater contamination and droughts were topics that the paper addressed. These were some details that I was able to connect to my issue.

Community Level Solution Communication Piece:

Overall, our freshwater supplies are decreasing. This calls for the conservation of water across all institutions including hospitality businesses. As a collective community, we can be the driving factor to systemic changes that prevent water scarcity from becoming a more severe reality.

Businesses/restaurants can help prevent depleting our water sources by making effective changes to limit the amount of water they use every day. To begin with, replacing some appliances with more efficient technology is an investment that will actually end up cutting monthly bills down immensely. Using a greywater recycling system that connects sinks and washing machines to toilets and gardens is an incredibly efficient way to use less water.

Having meatless or dairy-free options at a restaurant is another way the industry can address water issues. Just one pound of beef requires about 1,800 gallons of water. Therefore,

by replacing a beef item or even providing a meatless option, we can contribute to more sustainable and ethical practices. Red meat often requires thawing out which is typically done in restaurants by running water over the meat for hours at a time. Meatless and dairy-free options are in higher demand than ever in this current climate. In fact, research shows that plant-based foods are a booming business. Customers have increasingly been searching for these alternatives due to the growing awareness of the consequences of our food choices. By giving customers more secure food options, businesses also, in turn, diversify their customer base and immediately become more palatable to a wide range of consumers.

Businesses/restaurants can help prevent depleting our water sources by limiting the amount of water they use every day. Creating an environment that is welcoming to the diverse general public that makes up southern California. As a community, we can be more conscious about water and in turn, protect our environment and communities. The general public is constantly consuming new knowledge just based on what they see or read. Creating simple infographics can provide background as to why conserving water is important. Businesses can post them up in their restroom walls or hotel showers to bring awareness to the issue and remind individuals that this is a collective effort.

This new generation of consumers have a unique focus on finding climate friendly initiatives and business models that socially and economically promote this culture. By embracing this new era of sustainability and uplifting the voices of the community through these changes, businesses and the health of the planet can benefit immensely. As a community, we can be more conscious about water and in turn, protect our environment and communities.

Annotated Bibliography of Community Level Solution:

10. “2021 U.S. Retail Sales Data for the Plant-Based Foods Industry.” *Plant Based Foods Association*, https://www.plantbasedfoods.org/2021-u-s-retail-sales-data-for-the-plant-based-foods-industry/. Accessed 5 Dec. 2022.

This association referred to research done by other institutions that show the growing popularity of plant-based foods. It addresses the awareness of consumers and reflects on the industries such as dairy that contribute a lot to water issues. In regards to the economics of it, it provides a chart showing how fast the industry has grown these past few years. Therefore, I was able to use this information to support my statements that consumers demand more sustainable businesses.

11. “The Global Eco-Wakening: How Consumers Are Driving Sustainability.” *World Economic Forum*, https://www.weforum.org/agenda/2021/05/eco-wakening-consumers-driving-sustainability/. Accessed 5 Dec. 2022.

This organization reflects on the Economists research done about sustainability. It discusses how the demand for sustainable business practices have increased among consumers and is projected to increase. This supports the argument that businesses need to make changes that address water issues.

PESTICIDES & FARM WORKERS:

WORKING TOGETHER FOR A HEALTHY COMMUNITY

THE FIGHT

Pesticides used on crops often run off in the **water resources of farm worker communities**.

The work of César Chávez and Dolores Huerta have made great strides in protecting the health and working conditions of farmworkers.

However, the fight is not over.

WHAT IS RUNOFF?

Pesticides rarely stay in their original location.

Just as a dishwasher will wash away food and bacteria into a sewage system, rainwater and tillage will wash away pesticides from crops into bodies of water.

These contaminated bodies of water are used by local farmworker communities for essential daily needs (drinking, bathing, etc.).

PESTICIDES & COMMUNITY HEALTH

Due to farm worker communities' proximity to pesticides, contaminated water has a **larger effect on farm worker communities.**

Pesticides contain toxic chemicals that can lead to harmful health effects from repeated exposure in working or living environments.

These health effects can range from headaches, nausea, and rashes to cancer, birth defects, and reproductive harm.

"From the depth of need and despair, people can work together, can organize themselves to solve their own problems and fill their own needs with dignity and strength."

-César Chávez

LOOKING TO THE FUTURE

Rampant amounts of CO_2 released from the burning of fossil fuels act like a heat trapping blanket which causes the planet to warm. These higher temperatures disrupt natural seasonal patterns and **cause pests to stay in crops for longer.**

This increase in pests will cause an increase in pesticide use in the coming years. More runoff will occur and lead to higher concentrations of pesticides in local water sources, impacting farm worker communities.

Although this may sound scary, *you are not alone*! Communities can work together to prevent these health effects, **collectively**.

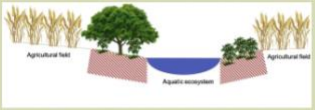
SOLUTIONS

SHORT TERM:

RUNOFF SYSTEMS

- work with local municipalities to develop a plan to address pesticide-contaminated water
- wells and other structures managed by community
- multiple farming communities can share resources
- provides an opportunity to build community resilience through education

VEGETATION BUFFERS



- borders of vegetation around bodies of water and in aquifer recharge areas
- acts as a boundary to catch contaminated runoff
- protects community health by reducing pesticides in water
- provides space for community bonding; can engage all ages in planting trees and greenery.

LONG TERM:

COLLECTIVE ORGANIZING

In the words of Cesar Chavez, "***¡Sí se puede!***" Yes, you can start a movement against all odds. Yes, you can fight for **fair wages**. Yes, you can demand measures that **support community health.**

Due to the profit-seeking interests of farm owners, community health measures are not prioritized.

Unionizing and collective action is a key step in restructuring our broken system–a system that prioritizes profit over people and the planet. Your **collective** voice can demand better working and living conditions and eventually start to tackle the environmental effects of pesticides to protect community health.

Farm Worker Unions

Written communication piece -

California is home to some of the most successful and influential labor organizing in the US, thanks to the great strides made by farmworker communities throughout the past century. The work done by César Chávez, Dolores Huerta, and others to promote equity and dignity will forever remain an important and cherished part of California's history and influence in the country. However, the fight is not over.

The wide variety of crops grown throughout the state of California usher in the use of many different pesticides. When the pesticides are sprayed, they do not just remain in the spot they were applied. Just as a dishwasher will wash away food and bacteria from a plate, rain and tillage washes away toxic chemicals in excess pesticides away from their initial location. These agricultural contaminants have the ability to reach both rivers, streams, and lakes as well as the freshwater stored in underground aquifers. The freshwater resources in these streams, rivers, and aquifers are then transported to residential areas that you all live in to be used for drinking water, cooking food, and bathing/showering. Many of these pesticides contain harmful chemicals that when ingested can lead to a range of different health complications from headaches, nausea, and rashes to cancer, birth defects, and reproductive harm (cite). Continuous exposure to these contaminants–such as regular use of contaminated tap water–can lead to one or many of these grave health complications which makes it very important to prevent this agricultural contamination from continuing.

In this era of climate change, pesticide contamination will continue to get worse. Rampant amounts of CO2 released from the burning of fossil fuels act like a heat trapping blanket which causes the planet to warm. These higher average temperatures disrupt natural seasonal patterns. This results in pests becoming more abundant and leads to them staying in crops for longer periods of time. Because of this, more pesticides will be utilized, increasing the likelihood of excess pesticides being carried away into drinking water supplies (cite). This has the potential to increase the health complications associated with pesticide exposure in farmworker communities.

As scary as this issue is, it is important to mention that there are ways to prevent agricultural water contamination and protect community health, as well as groups dedicated to helping farmworker communities face pesticide contamination. Some of these solutions include adding buffers such as vegetation to catch contaminated runoff, investing in precise pesticide application systems, and minimizing tillage. However, due to the profit-seeking interests of agricultural capital owners that exploit your labor for extremely low wages, protective measures are not generally prioritized. Unionizing and collective action is a key step in restructuring our broken system–a system that prioritizes profit over people and the planet. Your collective voice can demand better working conditions and pay and eventually even start to tackle the environmental effects of the business to protect community health. Since unionizing is more

difficult to do because of California's lack of funding, community-level solutions offer an alternative, in the meantime, to start the process of protecting the community and environment from harmful pesticides. An example of what these community level solutions could look like is an initiative to have the community plant vegetation to create buffer zones around local freshwater resources, or creating community-managed runoff systems. This would not only serve the purpose of lessening pesticide contamination, but it would also be a time for community bonding which is important in collective organizing in the long run.

Audience and Setting-

Audience Identity

- Live in and around large farming areas such as California's Central Valley
- They all come from low socioeconomic standings, as their pay is astoundingly low
- Many are Mexican-American while others are migrant workers from Mexico which are exploited for cheap labor

Audience Connection to Issue

- Since the farmworkers all live in and around agriculture-heavy areas, they are impacted by water contamination from agricultural practices.
    - These impacted communities play a central role in starting community-level solutions to tackle water contamination, such as an initiative to plant vegetation buffers or work with their local municipalities to create community runoff systems.
- Also, it is vital that higher pay, job stabilization, and adequate working conditions are achieved first for farmworkers. However, once they are attained and farm worker unions have more power, United Farm Workers can begin to make labor demands on environmental issues, such as water contamination. Since there is no product without labor, collective organizing gives laborers a lot of decision making power against capital owners. This allows the workers to make demands on the pesticides used and on protective measures to prevent contamination that can improve the health of their community. This makes farm workers a key role in solving agricultural water contamination.
- Agricultural water pollution, particularly the excessive use of pesticides and fertilizers, have a tremendous effect on California's farm workers and union organizers. Farm workers and union organizers have historically been mistreated by large corporations who rely on cheap farm worker labor. It is often smaller organizations who work with environmental justice who are the most trusted messengers; they work directly with affected stakeholders and have their best interests.

Setting -

- This would normally be given at a smaller community organizing event. We would get in touch with environmental justice organizations/coalitions that work within these communities to help organize or attend existing events; preferably, trusted community organizers would be able to implement this communication piece into these events.

Community organizing events are a way to include all stakeholders, including family and friends of farm workers, to garner both support and build resilience within an affected community. Educating members on how to transmute a historical water issue into a lasting, community-based solution is the first step to moving forward.
- Grassroots organizing events
- Community centers in farmworker communities
- At their place of work

Values-
- Utilizing the important cultural and historical figures of César Chávez and Dolores Huerta to highlight the values of fair working conditions, labor organizing, and dignity.
- Equity: Occupational health and safety/ Fair working conditions
    - United Farm workers value fair and equitable working conditions. This value is at the heart of achieving justice for farm workers, within farm worker unions or social/environmental justice organizations.
- Labor organizing
    - The farm working communities of California have an extensive history and connection to the importance of labor organizing. Throughout the mid-to-late 20th century, Mexican American farm workers engaged in some of the most influential labor organizing in the country, including boycotts, strikes, and efforts to unionize. Due to the historical and ongoing exploitation this community faces, collective organizing remains an important cultural value for farm workers.
- Dignity
    - Important cultural value for working class Latinos

Metaphor-
- Used the comparison of a dishwasher washing away food and bacteria from a plate to describe the process of agricultural runoff.

Explanatory Chain-
- We started by introducing the idea of labor organizing by recognizing the work of cultural figures that engaged in labor organizing on behalf of farm workers.
- Next, we made sure to develop a connection with our audience by stating specific cultural values such as equity and dignity.
- Once this foundation was established, we began by explaining the problem using a metaphor; we connected pesticide runoff to a dishwasher in order to facilitate universal comprehension.
- Then we established where the agricultural runoff and pesticides end up (in their drinking water and residential water). We then connected this to the health impacts farm workers experience due to runoff.
- Once the audience has a firm understanding of the problem and how it specifically affects their community, we made a connection between the local issue and the broader, systemic issue of climate change.

- Before moving onto the solution, we reassured their fears of this issue which allowed for transition into ongoing and potential solutions to the issue.
- Lastly, we presented multiple solutions in a digestible way. Solutions were all community-based but were split into short-term and long-term. It was important that we ended our chain by emphasizing the end goal of collective organizing.

Solutions-

- I**ncreasing unionization**
    - Increase workers' power to make decisions about how pesticides and fertilizers are used and how their impacts are managed to ensure their community health. Increases the power of the workers on their own accord and allows them to collectively demand specific conditions within their working environment.
    - By advocating for and demanding adequate health conditions at work, you simultaneously will help increase environmental health in your communities.
- **Creating Buffer Zones**
    - seed-bombing
        - Having community members plant vegetation along freshwater resources can add a buffer which can stop pesticides and fertilizers from reaching water sources by catching contaminated runoff
        - This would target farming communities and would allow the friends/family members of united farm worker organizers to have agency and power over their own land.
        - More than UFW organizers alone, community level solutions would bridge the access to local city councils that can institute measures.
- **Community Runoff/Water Systems**
    - Ex: treatment/formation of a new well, implementing waterline extensions, drinking water/wastewater consolidation to a nearby public water source, treatment of contaminated water source, etc.
    - Community managed water systems/treatment facilities
        - Construction of new distribution system to provide treated water to entire community
        - Requires formation of new public water system
        - Working to form a local entity to enable community ownership over a water system
        - Working together to develop a grand funding process for permanent solutions
        - Multiple disadvantaged communities can share resources (ex: operation expenses) to increase efficiency
        - Advocate for replacement drinking water until a permanent solution has been implemented

Annotated Bibliography

Values -

1. *History - Latino National Leaders*. Idaho Commission on Hispanic Affairs. (2011). Retrieved from https://icha.idaho.gov/menus/leaders.asp

Although not a peer-review source, this article gives insight into Latino leaders/cultural figures that did historic work for farmworkers in California and the value of dignity. In the description of César Chávez's work, they mention his reason for picking the Aztec Eagle as the symbol to galvanize farm workers. Chávez stated that "A symbol is an important thing. That is why we chose an Aztec eagle. It gives pride . . . When people see it they know it means dignity" (cite). Since this symbolism of dignity played a large role in giving courage to farm workers demanding fair working conditions, we chose to use it as a value in this framing piece.

2. Perez, L. (2021, April 7). *Essential and expendable: The rise of agricultural labor and the United Farm Workers*. National Museum of American History. Retrieved from https://americanhistory.si.edu/blog/essential-and-expendable

This source details the historical importance of labor organizing for United Farm Workers. It details workers' extensive history of uneven legal protection, prejudice, and exploitation. This treatment has birthed the fight for farmworker justice, as well as the formation of unions, and has since led to labor organizing becoming an important cultural value for agricultural laborers. This value, held by our audience, is tied to historic legacies and injustices and is deeply connected to current solutions.

Metaphors -

1. National Network for Ocean and Climate Change Interpretation (NNOCCI) (2017) *Changing the Climate Conversation: All Reframe Cards | Climate Interpreter'*. https://climateinterpreter.org/content/changing-climate-conversation-all-nnocci-reframe-cards

The National Network for Ocean and Climate Change Interpretation has done extensive research on the efficacy of using metaphors to communicate climate related issues to people without a scientific background. This source also shows how to redirect inefficient thinking problems when forming metaphors. With our particular audience, we want to convey that the issue of water contamination is a systemic issue, rather than an accident or fluke. We used a metaphor based upon values tested by this organization, particularly the value of environmental protection.

2. Hendricks, Rose. (May 29, 2018). Non Profit News | Nonprofit Quarterly. *Speaking Metaphorically: How Nonprofits Can Prevent Metaphor Meltdown in Their Communications*, https://nonprofitquarterly.org/speaking-metaphorically-nonprofits-can-prevent-metaphor-meltdown-communications/.

This source provides a thorough guide to creating and using an effective metaphor within nonprofit communication, including what to be cautious of. We used this source as a guideline to our dishwasher metaphor, purposefully using an object that is universally familiar. It contributed to our decision to stay clear of using a metaphor that instills fear or panic, especially within an audience with limited political power.

Explanatory Chain -

1. Nelson, Sara-Mae. (February 16, 2017). National Network for Ocean and Climate Change Interpretation (NNOCCI). *Framing with Explanatory Chains Module.* https://climateinterpreter.org/resource/framing-explanatory-chains-module

NNOCCI is a leading nonprofit in the world of environmental communication, which is the reason for choosing this source. In this Explanatory Chains Module, they describe how explanations facilitate deep comprehension, which is a goal for our communication piece. Furthermore, building upon information in a logical, step-by-step way allows for greater retention. Since we are communicating about a complex issue to a group of people who might not have English as a first language, we utilized NNOCCI's guide on explanatory chains to ensure the greatest comprehension and retention by our audience of farm workers.

2. Environmental Protection Agency (EPA) (2015). *Effective Risk and Crisis Communication during Water Security Emergencies.* https://www.epa.gov/sites/default/files/2015-08/documents/effective_risk_and_crisis_communication_during_water_security_emergencies.pdf

This source outlines methods for crisis communication that will be necessary for audiences at risk for potential incidents due to contaminated drinking and wastewater utilities. They emphasize the importance of ensuring that the target audience understands the depth of a specific problem; in our explanatory chain, we ensure that the problem of water contamination is a systemic issue that disproportionately affects our target audience. This source emphasizes that well-constructed, practiced, and delivered messages will inform the public, reduce misinformation, and provide a valuable foundation for informed decision making, all important factors to consider when creating our explanatory chain.

Solutions -

1. Integrated Regional Water Management Plan (IRWMP) (2017). *'Disadvantaged Community Plan for Drinking Water and Wastewater | Greater Monterey County'.* http://www.greatermontereyirwmp.org/documents/disadvantaged-community-plan-for-drinking-water-and-wastewater/.

This water management plan presents an exemplary example of a successful community-based water management plan implemented in farm worker communities in Salinas Valley. Working to address issues with pesticide and fertilizer-contaminated drinking and waste water, groups came together to implement short and long-term solutions, including developing a grand funding process for permanent solutions, implementing waterline extensions, water and wastewater consolidation, the formation or improvement of wells, and other projects. This source thoroughly outlines every aspect of multiple projects and provides tremendous insight to several project proposals, solutions, and other related efforts.

2. Udawatta, R. P., Garrett, H. E., & Kallenbach, R. (2011). Agroforestry buffers for nonpoint source pollution reductions from agricultural watersheds. Journal of environmental quality, 40(3), 800-806.

This scientific article discusses the efficacy of agroforestry buffers in agricultural watersheds. Since we are looking specifically at farm worker communities that live nearby agricultural sources of pollutants, this article applies to both the audience and setting. The study found that vegetation buffers provide a cost-effective way to improve water quality in agricultural watersheds. Because of these findings, we decided to include planting vegetation buffers as a community level solution.