

Plumbing the Divide: Cultural Perspectives on Responsibility for Household Water
Infrastructure in Phoenix, Arizona

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By

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Infrastructure in Phoenix, Arizona

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CHAPTER ONE

INTRODUCTION

Introduction

My Partnership with the CEE Lab at San José State University

For my project, I have partnered with the Culture, Economy and Environment (CEE) Lab at San José State University led by Dr. Melissa Beresford. My role within the CEE Lab initially began during my time as an undergraduate when I first participated in a team-based coding exercise intended to introduce students ($n = 12$) to qualitative codebook development methodologies using real respondent data. My positive experience within the CEE Lab encouraged me to continue exploring qualitative research by conducting a solo analysis for my Master's project that contextualizes the findings of a team-based coding exercise using the Plumbing Poverty Global Ethnohydrology data set (Wutich and Brewis 2006; Deitz and Meehan 2019; Meehan et al. 2020). The CEE Lab is an ongoing consortium of undergraduate and graduate students who hone our social science research skills in practical, real-world settings. The CEE Lab typically runs several concurrent projects, and CEE Lab researchers are free to engage with the types of research that are most meaningful and interesting to them including data collection and analysis, and quantitative and qualitative methods-based independent research projects.

Background

The study of economic exchange is a major cornerstone in anthropology that helps to contextualize and situate pressing issues in real time (Wutich and Beresford 2019). The economics of water is a useful *theory wheel* (Bulled 2015) that constantly churns in response to societal perceptions, expectations, and notions of deservingness as social conditions and institutional policies change (Wutich and Beresford 2019). The anthropology of water explores a host of issues ranging from political ecology (Ballesteros 2015; Boelens et al. 2016; Napieralski et al. 2022; Webb et al. 2024; Bulled 2015; Polk 2015), negative experiences of scarcity (Wutich et al. 2022; Bulled 2017; Rodriguez 2022), urban and rural water governance (Shi et al. 2021; Chelcea 2023; Wies et al. 2020; Du Bray et al. 2022; Hommes et al. 2019), expressions of class and status (O’Leary 2019; Vidmar et al. 2023) and efforts to minimize the role of the hydrological cycle in favor of the *hydrosocial cycle* to better express how water distribution is managed within a tightly controlled ecosystem (Linton and Budds 2014; Rosinger 2023; Radonic 2019).

Although bolstered by a wealth of research into many different avenues, currently there is very little thematic water research that explores responsibility specifically. As global water resources dwindle in the face of climate change (Ballesteros 2019), each droplet has become a hotly contested commodity capable of granting or stripping individuals of social status, comfort, and dignity. At the same time, the wealthy and highly urbanized United States is a site of growing rates of *plumbing poverty*, what Deitz and Meehan (2019) describe as a lack of hot and cold running water, flush toilets, and indoor bathing facilities. The census data often used to formulate and complement studies of water provide useful quantitative context but do not offer adequate anthropological insights into the ways people understand and describe water, which has

direct implications for the ways people interpret responsibility or their willingness to contest and advocate for access (Noga and Wolbring 2013; Hache 2007).

Significance and Deliverables

The deliverable for this project is an empirical article planned for submission to a peer reviewed journal. My aim in writing this paper is to contribute new knowledge to the study of water which underscores how responsibility - currently an understudied concept within the anthropology of water - may shift or change based on perceived social standing. As noted by Noga and Wolbring (2019), water is interpreted in many ways; for instance, those who interpret water as a future commodity attach different meaning and accountability mechanisms to its distribution than do those who interpret water as a human right, particularly on the issue of price. In the absence of a singular definition, responsibility for water is applied unevenly, providing assurances to some while imposing self-reliance on others.

My analysis includes an important distinction that considers responsibility for water directly within the context of housing. Because small-scale water infrastructure is embedded within residential walls, Meehan et al. (2020) note that access to water in other research scenarios presupposes access to housing (and thus, water) without accounting for other major considerations and contributing factors. The housing-water nexus contains a multitude of latent variables which directly impact access to both housing and water in the United States including race, class, and income (Meehan et al. 2020).

Finally, my ambition to publish the findings presented in Chapter Two in an academic journal will allow me to gain entry to the world of peer-reviewed publications under the guidance of a trusted industry professional, Dr. Melissa Beresford. I have ambitions to continue

my studies in a Doctoral program and learning to write in a professional manner that is suitable for publication is just one key component to achieving this goal. I look forward to facing the challenges of peer-reviewed publication to prepare myself for future academic endeavors.

Qualitative Research

Constructing a cultural model of responsibility for water through the examination of respondent narratives serves several important purposes. First, the ability to identify and expand the qualitative themes presented by respondents in an ethical manner is a crucial component to constructing sound anthropological theory (LeCompte and Schensul 2015, 4-6). Ethnography and open-ended interviewing are primary tools in the anthropological toolkit and the ability to accurately represent and synthesize the words, thoughts, and belief systems of others without ‘speaking for’ respondents is at the very foundation of what anthropologists stand for. Margaret LeCompte and Jean Schensul (2015, 7) argue for “advocacy *with* rather than advocacy *on behalf of* marginalized groups”. Second, the field of anthropology has shifted away from the study of cultures imagined to be ‘uncontacted’ or ‘preserved’ (LeCompte and Schensul 2015, 4) and has reorganized around the goal of studying contemporary populations within the context of contemporary societal, environmental, and political issues (Meehan et al. 2025; Meehan et al. 2020; Wutich and Beresford 2019; Bulled 2017). Only by identifying patterns and using those patterns to create frameworks can new knowledge and future solutions informed by respondents themselves be created.

Finally, the research presented here matters very little if it is conducted in isolation and with no regard for those most affected. As noted by LeCompte and Schensul (2015, 25), qualitative

studies are considered by many researchers to be invalid if they do not aim to both understand *and* meaningfully improve the material conditions of those who experience the conditions under study. Plumbing poverty is spreading in the United States, an unfortunate and persistent byproduct of the 2008 Financial Collapse that continues to fester unabated nearly twenty years later in twelve of the largest fifteen cities in the nation (Meehan et al. 2025). The contributing factors which produce and reproduce plumbing poverty are only now coming into focus as this phenomenon unfortunately cements itself into the daily lives of over one million people in the United States (Meehan et al. 2024; Meehan et al. 2020). Developing a clearer understanding of the social worlds (Emerson et al. 2011, 57) that are developing within the context of widespread plumbing poverty can also aid in formulating geographically specific solutions to meet immediate and future needs (Napieralski et al. 2020; Rosinger 2023).

Conclusion

The thematic findings presented in Chapter 2 will not dismantle plumbing poverty, but they will help to situate and characterize how people across different geographies and incomes interpret responsibility, an important social element of plumbing poverty. Providing a granular view of how responsibility is interpreted and perceived also provides clues for how responsibility manifests among respondents across different sites, potentially offering workable solutions which are both feasible and actionable. The publishing of this manuscript in a peer-reviewed journal will provide me with the opportunity to engage in meaningful conversation with seasoned water scholars who can provide useful feedback and critiques to help me hone my research skills and to familiarize myself with the processes involved in professional publication.

CHAPTER TWO

PLUMBING THE DIVIDE: CULTURAL PERSPECTIVES ON RESPONSIBILITY FOR HOUSEHOLD WATER INFRASTRUCTURE IN PHOENIX, ARIZONA

Abstract

This paper examines cultural perceptions of who individuals feel bears responsibility for ensuring access to working household water infrastructure across four distinct sites in the Phoenix, Arizona metropolitan area. Responsibility is a fuzzy concept that is not well defined within existing water scholarship. Growing rates of urban *Plumbing Poverty* (Deitz and Meehan 2019) within the United States are furthered by an unclear understanding of how, when, and by whom action should be taken when connection to water is inadequate or incomplete. A team of student researchers at Arizona State University under the supervision of Dr. Alexandra Brewis employed purposive sampling to collect semi-structured cognitive interviews ($n = 154$) of two home vignettes (one drawn to represent high material wealth and one drawn to represent low material wealth) across varying income levels and across the urban/rural divide. Students ($n = 12$) at San José State University's Culture, Economy, and Environment (CEE) Lab under the supervision of Dr. Melissa Beresford then used a team-based approach to content analysis and codebook development to develop four inductive codes (*Individual; Societal; Third Party; Multiple*) to identify levels of responsibility as described by respondents. What follows is a thematic analysis of the four inductive codes first identified within the CEE Lab. This analysis reveals that the wealthy home is described by respondents as part of society while the less

wealthy home is described by respondents as separate from society. Additionally, findings show that respondents describe the high-income home as more entitled to multiple forms of support. These insights reveal that responsibility and deservingness for water shift based on perceived social status.

Introduction

Water infrastructure in the United States is often understood to be a guarantee, framed as an embedded feature of modern citizenship that ensures the delivery of safe, piped water into private homes (Wilson et al. 2022). Yet for roughly two million people, these assumptions do not match lived reality. “Plumbing poverty” as Deitz and Meehan (2019) describe it, refers to households that lack access to basic indoor plumbing, including hot and cold running water, flush toilets, and indoor bathing facilities. Although commonly framed as an issue of rural isolation or extreme poverty, plumbing poverty is increasingly recognized in wealthy nations, among renters, and within urban centers where most Americans live (Meehan et al. 2020).

While physical infrastructure itself clearly plays an important role in ensuring safe and reliable water access, anthropologists and geographers have increasingly illustrated the social conditions and cultural assumptions that also drive water insecurity (Linton and Budds 2014; Bulled 2015; Jepson et al. 2017; Meehan et al. 2022; Meehan 2025). In other words, household water insecurity is not only a matter of pipes and fixtures; it is also shaped by how people understand whether those pipes and fixtures should be guaranteed, by whom, and for whom. Questions of “who is responsible” for ensuring working water infrastructure are embedded in everyday judgments about deservingness, blame, and support - judgments that can matter for

how people interpret housing conditions and whether they view infrastructure failures as private misfortune, personal neglect, or a public problem (Deitz and Meehan 2019; Meehan et al. 2020; Kusenbach 2020; O’Leary 2019). Responsibility, in this sense, is an underexplored concept in the anthropology of water, even though it has direct implications for how water governance is imagined, justified, and contested (Noga and Wolbring 2013; Hommes et al. 2019; Schwenkel 2015; Shi et al. 2021; Hache 2007).

This analysis examines cultural perceptions of responsibility for ensuring that households have and keep working water infrastructure among 154 residents in the Phoenix metropolitan area - a region of the United States actively grappling with a future of intensified water insecurity (Napieralski et al. 2022; Polk 2015; Radonic 2019). Data derive from semi-structured cognitive interviews conducted across four sites that vary by income and urbanicity. Using a vignette-based approach (Vins et al. 2014; Brewis et al. 2021), participants responded to drawn images of two houses: the first, a single-story basic one room residential structure, and the second, a double-story multi-room residential structure. Researchers asked respondents to describe who they believed was responsible for ensuring each home’s access to a piped water connection. Comparing these responses reveals how notions of responsibility shift with perceived household social position (Meehan et al. 2020; Wies et al. 2020; Kusenbach 2020; Lauremann and Mallak 2023; Hache 2007). The findings presented in the following sections illuminate how understandings of responsibility for water infrastructure become morally and politically differentiated and what the implications of that may be for water governance.

Background and Analytical Framing

The United Nations Sustainable Development Goals (2015) establish clean water and sanitation for all as a target for 2030 (Hommes et al. 2019). Water has been carefully and politically positioned within the hydrological cycle as both an unlimited renewable resource, as well as a wild and scarce environmental threat which demands human subjugation; neither assessment is without its critiques (Ballesteros 2019). Water's positionality as both a market commodity and as a natural resource creates some confusion and disagreement over its valuation (Noga and Wolbring 2013). Anthropologists who specialize in the study of water prefer to position water within the *hydrosocial cycle* to better reflect the constantly shifting definition of water as a resource, or a good, while also considering water's role as a political force capable of influencing perception and social status (Wutich and Beresford 2019; Radonic 2019; Polk 2015; Noga and Wolbring 2013; Du Bray et al. 2022). Whatever an individual's perceptions of water may be, measurable progress in the struggle to fulfill the goals of the United Nations has stalled, and in some cases, has even reversed course. Globally, 2,000,000,000 people face barriers in equitable access to water (Rosinger 2023) with 1.1 million of those residing in the United States (Meehan et al. 2020).

Indeed, an individual's experiences in fulfilling daily water needs can have tremendous impacts on their social standing (O'Leary 2019; Vidmar et al. 2023) as well as their willingness or ability to act as hydraulic citizens who feel empowered to press authorities for improved access and services (Bulled 2015; Anderson 2010). Water scholars reject the notion that water is a uniformly positive presence across populations and acknowledge that the daily pursuit to secure water is sometimes a painful reminder of the harms of the global marketplace, or a

stressful prospect marked by shame (Rodriguez 2022; Bulled 2017; Wutich et al. 2022).

Individual interpretations are intimately shaped and informed by location and experience.

To better understand the conceptual discontinuity, novel anthropological approaches which privilege lived experience and culturally informed realities over ‘expert’ knowledge (Wilson et al. 2022; Wies et al. 2020; Webb et al. 2024) and those that are poised to draw geographically specific inferences are necessary (Meehan et al. 2020). Unlike traditional water scholarship, which relies primarily on census figures and infrastructure data, this study foregrounds lived experience (Ballesterio 2019). This approach uncovers shared cultural understandings of responsibility – an understudied facet in the anthropology of water - by examining individuals’ cultural schemas about water within the context of housing. As noted by Quinn (1997), cultural schemas are representations of the world which are constructed through experience and are vividly stored in our consciousness over time. In conversation with cognitive anthropology and emergent water scholarship, this study investigates how residents understand and describe the responsibility to provide water (Noga and Wolbring 2013; Meehan et al. 2020). The central questions are, *who do individuals think is responsible for ensuring water reaches homes in the first place, and are there different perceptions among different populations based on their income level and geography?*

Study Setting and Design

Study Setting

This study is set in the Phoenix metropolitan area in Arizona, a region where water is both a routine feature of everyday life and a persistent object of planning, politics, and public concern (Napieralski et al. 2022; Brewis et al. 2021). As a large, fast-growing metropolitan area in a

desert environment, Phoenix provides a useful setting for examining how people imagine water as a household necessity and how they interpret who should be responsible for keeping water infrastructure working. Importantly, the metro area also contains sharp socioeconomic and geographic contrasts - between urban and more peripheral communities, and between higher- and lower-income neighborhoods - that shape how residents experience housing, public services, and civic inclusion (Napieralski et al. 2022; Meehan et al. 2020). These contrasts make Phoenix an especially useful place to study how responsibility for water infrastructure is perceived across different community contexts.

Site Selection and Comparative Design

This analysis draws on researcher interviews collected across four sites selected to vary along two dimensions: income level and urbanicity. The four sites in this study include:

- High-income urban: Scottsdale
- Low-income urban: South Mountain
- High-income rural/peri-urban: Queen Creek
- Low-income rural/peri-urban: Apache Junction

Together, these sites provide a structured way to examine whether and how perceptions of responsibility for household water infrastructure shift across settings that differ in both socioeconomic position and relationship to urban municipal systems. The following sections describe the interview protocol and vignette-based approach used across all sites, then present patterns in how respondents attributed responsibility across the two household scenarios.

Research Methods

Sampling and Data Collection

Researchers collected data through semi-structured cognitive interviews with residents of the Phoenix metropolitan area. Interviews were conducted by a team of student researchers at Arizona State University (ASU) under the leadership of Dr. Alexandra Brewis. Recruitment used purposive sampling across the four sites selected to vary by income level and urbanity (see Table 1): Scottsdale ($n = 39$), South Mountain ($n = 41$), Queen Creek ($n = 40$), and Apache Junction ($n = 34$). A total of 154 interviews were completed. These sample sizes exceed the recommended minimum sample size for comparative cross-site theme analysis (Wutich et al. 2021; Bernard et al. 2017).

During interviews, ASU student researchers asked respondents a series of open-ended survey questions related to their perceptions of the people in the home and their typical water service and use. Respondent questions include: “Tell me about the people who live in this house”; “Tell me about the water service inside and around this house”; Tell me about the kind(s) of water people are drinking in this house”; and “Tell me about the water that this house uses for general purposes like washing and cooking.” Next, the ASU research team showed respondents two images depicting different household contexts: the first, a single-story, basic, one room residential structure (intended to represent a low-income home) and the second, a two-story, multi-room residential structure (intended to represent a high-income home) (see Figure 1). For each image, interviewers asked: “Who is responsible for ensuring this house has and keeps a piped water connection or safe and adequate water supply?”. This vignette-based approach is useful for examining social perceptions because it allows researchers to hold the basic scenario

constant while observing how participants interpret the situation and assign responsibility (Brewis et al. 2021). Comparing responses across the two household images provides insight into how responsibility judgments shift based on perceived household status.

Data Analysis

Data analysis was conducted by twelve student researchers in the Culture, Economy, and Environment (CEE) Lab at San José State University under the supervision of Dr. Melissa Beresford. The team used a collaborative, team-based approach to content analysis and codebook development (Russell et al. 2017; MacQueen et al. 1998). Open-ended responses were coded by the CEE Lab in Verbi Software's MAXQDA using four responsibility codes that captured how respondents framed responsibility for household water infrastructure: (1) individual/household responsibility; (2) societal responsibility; (3) intermediate or third-party responsibility; (4) combination of multiple types of responsibility (See Appendix, Table 2). To assess validity and reliability of the CEE Lab's codebook, the twelve-person coding team evaluated inter-rater reliability for all four codes using Cohen's kappa. Each code achieved a kappa value of 0.7 or higher, indicating acceptable agreement among coders (See Appendix: Table 2). After all segments were coded, the CEE Lab team inductively identified themes among the coded segments. Comparative analysis proceeded in two ways: (1) across the depictions of the lower-income vs. higher-income home, and (2) among respondents across the four sites.

Table 1 Sample Sizes, Sites, and Geographic Information

Site	<i>n</i>	Description	Urbanicity or rurality	Mean income estimated from census data
Site 1: North Scottsdale	39	Affluent area with rapid growth and a highly competitive housing market; housing costs 41.9% above national average; well-developed public amenities.	Urban	99,159 (+/-32,188)
Site 2: Queen Creek	40	Low-density, higher-income commuter suburb. Public infrastructure and amenities are average in quality and accessibility.	Rural	95,763 (+/-19,577)
Site 3: South Mountain	41	Mixed-income area near the urban core. Some recent residential developments but the area is predominantly composed of lower-income households.	Urban	57,628 (+/-13,258)
Site 4: Apache Junction	34	Lower-income, peri-urban area situated on the metropolitan fringe. Portions of the housing stock lack connection to municipal water infrastructure.	Rural	47,682 (+/-12,899)
N	154			



Home #1 (above)



Home #2 (above)

Figure 1: The two line sketches of the homes used in the vignette elicitation. Home #1 (top) represents higher material wealth while Home #2 (bottom) represents lower material wealth. (Brewis et al. 2021).

Findings

Respondents across all four study sites described responsibility for household water infrastructure as mixed rather than exclusively individual or exclusively societal. For both the high-income and low-income house images, participants most often understood water provision as a shared but clearly demarcated responsibility between public institutions and the people living in the home. In this cultural model, society is responsible for bringing water to the property, while residents are responsible for maintaining service within the household and paying for access.

Respondents frequently described this division in spatial terms. As one participant explained, “Wherever the meter is, from there on, it’s the homeowner. The rest is the water company. They both make sure” (Apache Junction, LI-R [Multiple: Individual and Third Party, Respondent ID: AZAP08]). Others used nearly identical formulations, such as: “The city is responsible up to the water meter and homeowner is responsible after the water meter” (Queen Creek [Multiple: Individual + Societal, Respondent ID: AZJC06]), and “The city to curbside, the property owner once on the property” (Apache Junction [Multiple: Individual + Societal, Respondent ID: AZTGR01]). Another respondent summarized this arrangement succinctly: “The city. They keep all the pipes going to the house safe by regulations and stuff. The people pay for the water though” (South Mountain, LI-U [Multiple: Individual + Societal, Respondent ID: AZAH04]).

There were no significant thematic differences in the responses among respondents across all four sites in this study. Respondents across all sites consistently imagined civic institutions as responsible for transporting water, maintaining broad supply, and ensuring safety through regulation, while individuals were expected to pay their bills, monitor their household systems, and address problems within the home. In this sense, respondents did not frame water access as

purely private or purely public. Instead, they described a partnership between household residents and larger civic entities.

However, this baseline cultural model was not applied equally to the two homes. Although both images elicited descriptions of mixed responsibility, respondents across all four sites positioned the high-income and low-income homes differently within that shared framework. The high-income home was more often imagined as securely embedded within a reliable network of public systems and social supports. The low-income home, by contrast, was more often described as dependent on the efforts of its residents, on informal or third-party help, or on improvised forms of water access. The result was not a different model of responsibility altogether, but an unequal version of the same model.

The Higher-Income House: Part of Society

For the high-income home, societal responsibility was especially salient. Respondents consistently positioned this home within a stable civic order in which safe and adequate water supply was expected, professionally managed, and backed by longstanding public obligation. They viewed this as part of society: securely connected to municipal systems, protected by regulation, and supported by multiple institutions beyond the household itself.

Participants often described the high-income home as belonging to a “safe city with good rules” and assumed that access to water was ensured by the municipality as a matter of course. One respondent explained, “The municipality or city [is responsible] because it looks like a fairly sophisticated home, so it must be in a safe city with good rules” (North Scottsdale, HI-U [Societal, Respondent ID: AZHD04]). Others described water provision to this home using definitive language: “The city is responsible because we’re paying them and it’s just the

arrangement that they're providing water to houses" (North Scottsdale, HI-R [Societal, Respondent ID: AZCVO05]), or, more simply, "that's how society works" (Queen Creek, HI-R [Societal, Respondent ID: AZRF04]). Statements like these framed water access for the high-income house as normal, expected, and institutionally guaranteed.

Respondents also strongly associated this home with homeownership, permanence, and financial competence. The presumed residents of the high-income home were often described explicitly as homeowners and were understood to possess the economic means to maintain service, hire professionals, and resolve problems if they arise. Participants suggested that "if they own the house, they'd have enough money to fix repairs" (Apache Junction [Multiple: Individual + Societal + Third Party, Respondent ID: AZAP05]) and that "they would have the income to hire a professional to help" (Queen Creek HI-R [Individual, Respondent ID: AZMM02]). In this framing, respondents understood individual responsibility for the high-income home as financial rather than embodied. They stated that residents were expected to pay taxes, pay their water bill, and contact professionals when needed, but not to personally haul, boil, test, or otherwise manually secure daily water access.

This distinction mattered. Respondents did not imagine the high-income home as operating in isolation. Rather, they described it as surrounded by support. In addition to municipal water systems, participants referenced broader networks such as homeowners' associations, utility companies, community structures, and local government. These forms of support were often seen as automatic extensions of the home's social position. As one respondent noted, "The house owner or maybe the community they live in—they have the city meetings where they complain about everything" (South Mountain [Multiple: Individual + Societal, Respondent ID: AZFR03]). Another described the city and utilities as bound by "codes and standards", emphasizing that

these institutions “have to keep up” services and safety for homes like this one (South Mountain, Multiple: Individual and Societal, Respondent ID: AZFR04].

The high-income home was also linked to political recourse. Respondents implied that the people living there would know how to raise complaints, navigate formal channels, and demand service improvements. They were imagined as legitimate claimants on public systems. This was not simply a matter of having water access; it was also a matter of belonging within the institutions that govern it. The home’s residents were perceived as people whose concerns would be heard, whose taxes justified service, and whose relationship to public infrastructure was secure and enduring.

Taken together, these responses show that the high-income home was understood not merely as a house with plumbing, but as a household fully incorporated into civic life. They imagined it situated inside municipal boundaries, inside regulatory concern, and inside networks of financial, political, and professional support. In respondents’ accounts, this home was part of society.

The Lower-Income House: Separate from Society

Although respondents also described the low-income home using a mixed-responsibility model, societal responsibility was less salient and far more uncertain. Compared with the high-income home, the low-income house was more often framed as the burden of its residents, of landlords or property managers, or of informal helpers. It was also more likely to be imagined as poorly connected, unprotected, or even outside the reach of formal water systems altogether. Across sites, respondents positioned this home as *separate* from society.

One important difference was ownership status. While the high-income home was readily identified as owner-occupied, the low-income home was more often described in noncommittal

terms such as “the people who live there,” “tenants,” “occupants,” or “the family.” Respondents were much less likely to call these residents homeowners and more likely to invoke landlords, apartment managers, or other third parties. This uncertainty mattered because it shifted responsibility. Where the high-income home was anchored by stable ownership and clear civic entitlement, the low-income home was treated as socially and institutionally ambiguous.

Respondents also described a heavier burden of individual responsibility for the low-income home. Unlike the high-income house, where individual responsibility was largely financial, responsibility here was often framed as both financial and embodied. Participants suggested that residents would need to “go out and completely find it themselves” (South Mountain LI-U [Individual, Respondent ID: AZAH03]), “do what they can to make it work” (Queen Creek, HI-U [Individual, Respondent ID: AZMM02]), or secure water through their own labor because “they don’t have the disposable income to hire someone” (Queen Creek, HI-U [Individual, Respondent ID: AZMM02]). One respondent explained, “They’re responsible for making sure the well has enough water. They are responsible because they can’t afford to pay someone else” (South Mountain, LI-U [Individual, Respondent ID: AZMS01]). Another stated that “everyone in the house is responsible, except an infant. Everyone mature enough to know you need water is responsible” (South Mountain, LI-U [Individual, Respondent ID: AZCRL04]).

This heavier burden also appeared in the specific tasks respondents assigned to the low-income home. Rather than assuming that water quality checks, repairs, and system maintenance would be handled through the city or licensed professionals, participants often assigned these duties to residents themselves. Respondents suggested that the people in the house might need to maintain cisterns, monitor wells, taste water to determine whether it was clean, boil water, purchase bottled water, or find filling stations. One participant stated, “The person who lives

here is responsible for making sure they get bottled water and check the well water by tasting it and seeing if it's clean" (South Mountain, LI-U [Individual, Respondent ID: AZCRL05]).

Another said, "The parents are responsible...they should boil the water" (South Mountain, LI-U [Individual, Respondent ID: AZCRL02]). These responses normalized self-sufficiency and embodied labor as the means by which low-income households secure daily water.

The low-income home was also more likely to be described as spatially outside the bounds of formal infrastructure. Respondents frequently imagined it as a dwelling on the outskirts of town, beyond the reach of a local water district, or disconnected from plumbing entirely. This theme did not appear for the high-income house. Some participants stated directly that there was "no pipe connection" (South Mountain, LI-U [Uncodeable, Respondent ID: AZGA01]), that "nothing is connected to the house" (Queen Creek, HI-R [Uncodeable, Respondent ID: AZAB02]), or that "no one could be responsible" because the home lacked formal infrastructure altogether (Queen Creek, HI-R [Uncodeable, Respondent ID: AZAB05]). Others assumed reliance on wells, cisterns, hauled water, shared water, or bottled water. Even when respondents acknowledged that the city should ideally bear some responsibility, they often described the home as practically beyond the reach of consistent municipal care.

The language used to describe the low-income home was also notably different. Where the high-income home elicited certainty, stability, and entitlement, the low-income home was described with doubt and, at times, overt stigma. Respondents referred to it as a "low worth home" (South Mountain [Individual, Respondent ID: AZAF01]), a house "not properly piped" (Queen Creek, HI-R [Individual, Respondent ID: AZRF01]), or a place where the city "probably doesn't care" (North Scottsdale, HI-U [Individual, Respondent ID: AZHD02]). Some attributed lack of access to the perceived failings of the residents themselves, suggesting they lacked the

“tools,” “knowledge,” or education to build or maintain proper systems (Queen Creek, HI-R [Individual, Respondent ID: AZRF01]). In the most extreme cases, respondents described the occupants in openly demeaning terms: “The creepy old man who lives there” (North Scottsdale, HI-U [Individual, Respondent ID: AZTC08]), or “If she cared, she’d make sure it was good quality. It would be a big effort getting water for her little family. She might steal” (North Scottsdale, HI-U [Individual, Respondent ID: AZCVO05]).

This stigmatizing language is analytically important because it reveals that greater individual responsibility for the low-income home was not only a practical judgment. It was also a moral one. Respondents did not simply imagine fewer institutional supports for this home; they often described its residents as less deserving of support, less competent to manage infrastructure, or less fully entitled to public care. In this way, the low-income home was not merely seen as under-resourced. It was also symbolically distanced from the social world that made support seem normal for the high-income house.

That distancing also appeared in descriptions of law and government. For the high-income home, legal and regulatory systems were framed as protections that ensured standards and allowed residents to demand accountability. For the low-income home, law was more likely to appear as neglectful, absent, or punitive. Respondents noted that complaints to the city would “fall on deaf ears” (Apache Junction, LI-R [Individual, Respondent ID: AZCMC04]), that municipalities were “attached to it but...don’t care too much” (South Mountain, LI-U [Societal, Respondent ID: AZAE03]), or that residents would be expected to “abide by homeowner laws” even while receiving unreliable service (North Scottsdale, HI-U [Multiple: Individual + Third Party, Respondent ID: AZEBJ03]). Rather than imagining these residents as empowered water

citizens with recourse, respondents portrayed them as isolated from the institutions that govern water access.

Taken together, these responses show that the low-income house was understood as socially peripheral. It was imagined as less securely connected, less institutionally protected, and more dependent on household labor, landlords, friends, and improvised arrangements. In respondents' accounts, this home was apart from society.

Unequal Entitlement to Support

The contrast between the two homes reveals more than a difference in perceived responsibility; it also reveals a difference in perceived entitlement to support. Respondents across sites described the high-income home as more deserving of multiple forms of assistance, while the low-income home was framed as more individually burdensome, more doubtful in its claims on society, and more reliant on self-help.

For the high-income home, support was layered and expansive. Respondents referenced not only the city and utility providers, but also homeowners' associations, community structures, repair professionals, and local political channels. This home was imagined as benefiting from a broad support network that could be activated when needed. Its residents were presumed to have the knowledge, money, and legitimacy to draw on those systems.

For the low-income home, support was narrower, more conditional, and often informal. Help might come from a landlord, a property manager, or friends, but respondents frequently assumed that residents would have to take the initiative themselves and that outside assistance might be unavailable, inadequate, or undeserved. In place of expected public support, respondents

emphasized coping: boiling water, tasting well water, hauling water, buying bottled water, or managing scarce supplies by hand.

This pattern suggests that respondents understood the two homes differently in relation to society itself. The high-income home was positioned as belonging inside a civic and infrastructural order that reliably provides care. The low-income home was positioned as outside that order—geographically, politically, and morally. Respondents saw the first house as part of society and the second as apart from it. That distinction shaped not only who was held responsible for water, but also who was imagined as worthy of institutional support in the first place.

Discussion - “A nice home in a nice area” vs. “Shacks like this”

The findings suggest responsibility for water is not a static category; rather, it is socially assigned depending on the visible or even implied infrastructure, perceived household wealth, and assumptions about civic inclusion, what Hommes et al. (2019) define as a *water imaginary*. Across all four sites, a home’s perceived connection to municipal infrastructure results in responsibility being framed as both shared and demarcated: local municipalities and city governments are described by respondents as managing water distribution to a specific boundary (typically a home’s curb stop or the water meter), while the homeowner or occupant maintains internal plumbing. In these scenarios, water is conceptualized as a highly regulated public utility delivered through an established civic relationship. Taxes and bills are exchanged for safe service. In this arrangement, institutional oversight, chemical testing, regulatory compliance, and professional maintenance are all expected features. Importantly, respondents did not describe this

arrangement solely as a technical system; they also framed it as a marker of which households properly belong within the sphere of normal civic care.

However, when infrastructure is perceived to be absent by respondents (e.g., homes that appear to be rural or that may rely on a well, tank, or informal connection), responsibility for water shifts away from guaranteed institutional support and toward individuals, households, landlords, and informal supports. This shift is especially pronounced in responses to the low-income home, where participants more often imagine residents as responsible for securing, monitoring, and maintaining water through their own labor, limited finances, and social networks. While some respondents interpret this through an economic lens, the shift is also shaped by assumptions about ownership, competence, and social belonging. Narratives of abandonment, distrust of civic institutions, and the normalization of self-reliance and embodied collection strategies are especially visible in descriptions of the low-income home. Respondents articulate a survival-based model of water provisioning - a particularly salient sentiment among rural respondents in our study - wherein residents must secure, transport, monitor, coordinate, and repair their own supply.

These patterns illuminate how demarcated responsibility is applied unevenly. The socially recognized boundaries between public infrastructure and private obligation operate most clearly where formal systems are present. Where infrastructure is assumed and regulated, responsibility becomes shared and institutional. Where infrastructure is thought to be absent, respondents shift greater responsibility onto residents, households, landlords, and informal forms of support, reducing expectations of public care. The transition from civic entitlement to household burden is not merely technical but instead reflects an implicit hierarchy of citizenship. Access to reliable piped water is framed as a marker of belonging within the formal governance regime, while

those perceived to be outside of that regime are repositioned as individually accountable for their own survival or dependent on precarious informal supports. Taken together, these findings suggest that respondents imagine the high-income home as part of society and the low-income home as apart from society.

Plumbing poverty, then, is not only the material absence of safe and reliable water infrastructure. Rather, it is also the social allocation of responsibility away from the state and onto households when infrastructure is missing, inadequate, or degraded (Hache 2007; Schwenkel 2015). By examining how responsibility is described across income and geographic contexts, our study reveals how water governance becomes morally and politically differentiated based on respondents' interpretations of two contrasting home images. In doing so, it reframes plumbing poverty as both an infrastructural condition and a shared cultural logic, one that delineates who is entitled to regulated service and who must rely on self-provisioning at the margins of the system. These judgments do not simply sort households by infrastructure type; they also sort them by perceived deservingness.

Across the four sites we surveyed, the outward appearance of each home in our study triggered different imaginaries in the minds of our respondents (Hommes et al. 2019). The high-income home, presented as a two-story home with decorative roof tiles, a second-story balcony and embellished window coverings, triggered a water imaginary (Hommes et al. 2019) of homeownership that is supported by stable municipal service and an expectation of reliable access through timely bill payment and civic incorporation. Close spatial proximity to publicly-provided infrastructures ensures full envelopment into a geography of privilege for the high-income home (Laureman and Mallak 2023; Meehan et al. 2020; Napieralski et al. 2022) which offers a full range of services including transport, testing, repairs, and - crucially - options for

seeking accountability or civic recourse in the event of disruptions to service (Anderson 2010). Respondents note that the residents of the high-income home are responsible for water in a dual sense: homeowners are aware of the status of their interior plumbing (Chelcea 2023) and future water bill payment dates and will manage these commitments under the umbrella of individual responsibility. The local water supply in Phoenix is within reach of ‘*a nice home in a nice area*’ [Queen Creek HI-R (Third Party, Respondent ID: AZRF02)] because ‘*that is how society works*’ [Queen Creek HI-R (Societal, Respondent ID: AZRF04)]. For the high-income home, institutional support is both expected and widely assumed while deservingness is baked into the discourse. The occupants imagined residing in the high-income home are less likely to be blamed when issues do arise and are granted inherent discursive access to both repairs and civic recourse in the words of our informants. In respondents’ accounts, this house is not imagined as operating in isolation, but as fully incorporated into a network of civic, financial, and professional support.

The low-income home, a single-story dwelling with a tin roof, screen door, single window, and no embellishments, triggered a water imaginary of liminality, self-sufficiency, municipal neglect, and few options for legal or public recourse in the event of service disruptions, contamination, or damage. For the low-income home, institutional support and notions of deservingness are low while individual responsibility and blame are heightened. Homeownership is rarely implied by respondents for the low-income home, with respondents instead preferring to employ language which implies dubious or unknown ownership status leading to an increase in third-party responsibility, or societal responsibility which is positioned outside of traditional water markets that are managed by official bodies. The low-income home also elicited overtly stigmatizing language that was absent from responses to the high-income home, suggesting that reduced institutional support was accompanied by moral distancing as well as practical doubt. In

a nation of renters (Meehan et al. 2024), the perception that those who do not own their home are also less entitled to the support of society sets a dangerous precedent for the future. This suggests that housing tenure may shape not only material access to infrastructure, but also cultural judgments about who deserves institutional care.

Future Directions and Conclusion

A discursive chasm emerges between the two depicted homes in this study and the perceived rights of those imagined residing within. Language communicates more than just meaning; it is also used to express status and can be repurposed to denote solidarity (Tamasi and Antieau 2014). The findings show that respondents did not simply imagine different kinds of water infrastructure for the two homes; they also imagined different kinds of social membership, deservingness, and entitlement to support. The high-income home was more often positioned as part of society and therefore as worthy of layered institutional support, while the low-income home was more often positioned as apart from society and therefore as a site of heightened individual burden, stigma, and blame. The distribution of stigmatizing language across all four sites further suggests that exclusionary understandings of deservingness are not confined to affluent respondents alone, but circulate across social positions, including among people who may themselves experience infrastructural precarity.

Key to dismantling the conceptual discontinuity between unlimited entitlements for some and self-sufficiency and survival for others is to recognize opportunities for solidarity along both upper - and lower-class lines and along the urban/rural divide (Shi et al. 2021). Addressing plumbing poverty requires attention not only to the material absence of infrastructure, but also to the cultural logics that shape who is imagined as deserving of reliable service and public support.

Water citizenship (Bulled 2015; Bulled 2017; Webb et al. 2024) may be unevenly extended depending on assumptions about homeownership, permanence, and civic belonging. As opportunities for homeownership continue to decline (Meehan et al. 2025; Meehan et al. 2020; Deitz and Meehan 2019), it becomes increasingly urgent to recognize that renters, too, deserve unencumbered access to water and the full protections of public infrastructure. Likewise, the tendency to dismiss rural or seemingly unconnected households as naturally outside formal systems deserves closer scrutiny. Rather than treating such households as beyond the reach of public concern, future research and policy should examine how cultural narratives of self-sufficiency and disconnection can normalize unequal access to water. In this sense, rethinking responsibility for household water infrastructure requires not only technical solutions, but also a broader cultural reconfiguration of who is recognized as part of society and therefore entitled to care.

CHAPTER THREE

CLOSING THOUGHTS

Summary

Qualitative analysis is a powerful methodology that can be used to plumb the depths of complex issues related to water governance and scarcity issues in ways that metric-based scholarship alone cannot replicate. For brief and lengthy narratives alike, qualitative researchers are granted an intimate glimpse into what Rumelhart (1980) termed the “building blocks of cognition” (Bernard et al. 2017, 272-273) that provide a useful snapshot of the lived realities and cultural expectations of those closest to these issues (Ballesteros 2019). Importantly, mental models occupy a unique cognitive space that exists between the conventional and the unconventional (Bernard et al. 2017, 273). This unique positionality provides researchers with sufficient data to construct theories and frameworks but also leaves open the possibility of future studies by focusing on the potential inconsistencies, variances, and inconclusive findings rendered through the construction of cultural schemas.

Respondents in our study express a particularly salient shared understanding that societal responsibility for plumbing shifts noticeably based on both housing type and the perceived social standing and tenure of its occupants (Deitz and Meehan 2019; Meehan 2020; Meehan et al. 2025). Indeed, Meehan et al. (2020) determine both housing type and perceived length of tenure to be strong statistical indicators for experiences with plumbing poverty. Respondents in our study and elsewhere assert that renters and mobile home occupants exist in a state of liminality

(Kusenbach 2020), described as residing within a temporary holding pattern that *may* eventually end, but offer no qualitative pathways or metrics for discursive escape.

In recent years, urban and rural geographies in the United States have become increasingly intertwined (Shi et al. 2020). Shared resource allocation is actively redefining previously distinct geographies through a shared reliance on broad hydrosocial territories, resulting in increased urbanization and offering new opportunities to build hydraulic solidarity (Shi et al. 2020). However, this potential for solidarity also relies on discursive recognition from respondents across geographies and incomes to thrive. As evidenced in our study and elsewhere (Kusenbach 2020; Shi et al 2020), it is often the most vulnerable and marginalized populations themselves who tend to deploy stigmatizing or demoralizing language that works to fracture efforts at solidarity. Water scholars, linguists, and cognitive anthropologists should continue to probe to better understand the underlying contributing factors.

Limitations and Future Recommendations

Our study focuses on one major metropolitan area in Phoenix, Arizona, USA. As noted by Meehan et al. (2020), findings at one scalar level (e.g., the city) may not track similarly at another scalar level (e.g., the county or state). Future research efforts by water scholars and policymakers may capitalize on the findings presented here to plumb for overarching thematic similarities and disparities across entire hydrosocial territories (Boelens et al. 2016) to gain insights into how and if perceptions have changed since the data for this study was collected in 2019.

New and major water challenges have emerged since this data was first collected. The ubiquity of artificial intelligence (AI) and the unquenchable water demands of the data centers that support AI systems were not yet a salient concern for individuals or communities at the time of the original Plumbing Poverty study in 2019. Recently, communities in the United States, urban and rural alike, have banded together to protect their hydrosocial territories from the threats of unmitigated modernity by forcibly rejecting proposals for data centers which threaten local freshwater supplies (Vries-Gao 2026). How might perceptions of responsibility have changed with the emergence of AI data centers? Future studies that explore new opportunities for solidarity in the face of emergent technologies and water use may be appropriate.

Studies of water must continue to incorporate studies of housing in their analyses to adequately situate the key drivers of plumbing poverty (Meehan et al. 2025; Meehan et al. 2020; Deitz and Meehan 2019) and to isolate useful solutions. As the United States has transformed into a nation of renters, qualitative discourse around perceptions of deservingness for ‘temporary’ residents (i.e., renters and mobile home occupants) and ‘permanent’ residents (i.e., homeowners) has not kept pace with statistical reality. Homeownership is less attainable now that it has been at any point in the nation’s history (Meehan et al. 2025) and future qualitative studies may provide insights into changing perceptions or even offer emergent solutions themselves.

Finally, the rhetorical disjunctions around responsibility and deservingness as they relate to household water should continue to be explored. As noted by Hache (2007) and Shi et al. (2020), responsibility is inherently spatially situated. Individual spatial proximity to state-sponsored services - and the implicit assurances these services provide - can have a tremendous impact on how individuals perceive their station and understand the options available to them (Bulld

2015). Importantly, less wealthy geographies may have inadequate public services but often provide labor and taxes to the municipalities which funnel these resources to geographies of privilege (Lauermann and Mallak 2023; Vidmar et al. 2023; Kusenbach 2020; Swain et al. 2023; Anderson 2010).

Closing Remarks

The study of water extends far beyond physical tasks: daily household use (O’Leary 2019), regional allocations (Polk 2015), distribution methods (Schwenkel 2015), and new ways to capture water (Radonic 2019) only tell part of the story. Water is also employed discursively in the construction of modernity and future-making practices (Ballesterio 2019; Wilson et al. 2022; Schwenkel 2015; Vins et al. 2014; Webb et al. 2024). Cultural schemas are not static and are constantly shifting as new information, new policies, and new ideas are presented (Bernard et al. 2017). The future of water governance can be designed to be more inclusive and more equitable, but only with the verbal and social recognition that access and availability rely on more than just pipes and faucets to succeed.

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Appendix

Table 2. Codebook definitions outlining the four levels of responsibility identified by the CEE Lab at San José State University

Code	Definition	Exemplars	Kappa
Individual Responsibility	Anyone that occupies the household - whether an owner or renter provides working household water infrastructure.	Typical exemplars: Parents (father and wife), head of the household, individual who pays the bills/have income, rural area, family members, residents. Atypical exemplars: Responsibilities are passed down to younger individuals in the family/household (younger generation). Close but no: Landlords	0.7+
Societal Responsibility	The government and city are responsible for maintaining a safe standard for the water filtering system and quality pipelines and ensuring that the water is supplied to the houses because the homeowners are paying taxes for the water bill.	Typical exemplars: Any mention of the city or government and community. Atypical exemplars: Federal and state regulators, town councils, and municipalities. Close but no: Plumbing companies	Kappa: 0.7+
Intermediate/ Third-Party Responsibility	Groups separate from the government and individual responsibility that provide water to households.	Typical exemplars: Non-profit organizations, utility companies. Atypical exemplars: Plumbers Close but no: Governments	Kappa: 0.7+
Multiple Types/Parties Responsibility	A combination of multiple parties responsible for providing the water infrastructure and supply.	Typical exemplars: Individual and societal responsibility, societal and intermediate/third-party responsibility, individual (renter contacting landlord who then calls third party for support, or city responsible for infrastructure to the house, individually	Kappa: 0.7+

responsible for infrastructure within the house.

Atypical exemplars:
Changes in responsibility depending on the location of the house (e.g. rural and city), or type of water system being used (e.g. municipal network vs. well/rainwater harvesting/etc.); government/third-party responsible for providing service, but the individual still has to provide payment; respondent says one type OR another type.

Close but no: Government responsibility, theorized assumptions on responsibility (Government should be responsible but...), mentions of multiple forms of one type of responsibility, e.g., “the husband and the wife are responsible” or “the state and local government are responsible”
