Evaluating the Low-Income Household Water Assistance Program: Barriers and Opportunities in Advancing Water Affordability and Equity

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Research Problem Statement

Access to affordable water is a growing concern in the United States, with between 7.5 million and 21.3 million households facing water burdens[1]. 10% of households in the US experience "high burden", defined as spending more than 4.5% of their income on water and sewer bills[2]. Water burden disproportionately impacts communities with higher populations of Black and Hispanic residents, who often experience lower income levels[3]. Addressing water burdens for households served directly or indirectly by water utilities would require annual water bill assistance ranging from $2.4 billion to $7.9 billion[1]. This escalating crisis has highlighted the need for comprehensive strategies to ensure water affordability and equity, particularly for vulnerable populations.

In response to the escalation of water affordability concerns during the COVID-19 pandemic, the U.S. Department of Health and Human Services introduced the Low-Income Household Water Assistance Program (LIHWAP), which operated from December 2020 to March 2024. LIHWAP provided a total of $1.12 billion in assistance for water bills to households with incomes at or below 150% of the federal poverty line or 60% of the state median income[1,4]. There is an ongoing bipartisan attempt to permanently establish low-income water assistance as an extension of LIHWAP, as affordability of water among low-income populations in the United States has gradually worsened over the past six years[5,6]. Hence, this study evaluates the extent of LIHWAP adoption in communities and barriers to access, using the state of California as a case study. Furthermore, we evaluate the effectiveness of the LIHWAP in improving access to essential water services and furthering water equity using[7]. These findings will be used to contextualize considerations associated with creating long-term water affordability policies for the US.

Research Methodology and Approach

Our study uses a mixed-methods approach with explanatory sequential design[8]. Our initial hypotheses regarding LIHWAP adoption and funding distribution are developed through analysis of data from partners at the California Department of Community Services and Development. Using logistic and multivariate regression models, we assess the relationship between water system characteristics such as race, income, water affordability, and population trends, and whether water systems offered LIHWAP aid, as well as the proportion of eligible households funded and the amount spent per eligible household. Using block group-level census data, we model the socioeconomic and demographic characteristics of public water systems. We then identify systems serving "disadvantaged communities", defined by California as public water systems with an annual median household income of less than 80% of the state median income[9]. We contextualize our findings by conducting stakeholder interviews and surveys regarding awareness of LIHWAP, key benefits and barriers to application. The findings from the qualitative and quantitative studies will provide deeper insights into the systemic and localized factors influencing LIHWAP participation.

Key Findings

Our findings look at two primary metrics: (1) The overall adoption of LIHWAP among state-defined disaddvantaged water systems in California, and (2) The characterization of funding among water systems that provided any amount of assistance to households through LIHWAP.

With respect to metric (1), only 3.4% of eligible households in California receive any assistance. Our results show that over 80% of public water systems serving disadvantaged communities did not provide any LIHWAP funding to eligible households, despite being enrolled in the LIHWAP. Water systems serving larger overall populations and those with a higher percentage of urban populations were more likely to provide funding to households. Water systems relying on surface water as their primary source are also significantly more likely to receive funding (Table 1).

Variable	Coefficient	Odds Ratio	Confidence interval
Median Household Income (Scaled)	-0.012	0.988	0.97-1.01
Race			
% Hispanic	0.0056	1.01	1-1.01
% Black	-0.0278	0.973	0.92-1.03
% Asian	-0.018	0.982	0.94-1.02
% AI/AN	0.0239	1.02	1.01-1.03
% Urban	**0.0196*****	0.994	0.96-1.03
% Unemployed	-0.0063	0.994	0.96-1.03
Population served	**0.0163*****	1.02	1.01-1.03
Ownership			
Private	-2.82	0.0595	0.03-0.11
Primary Water Source			
Water purchased	-0.759	0.468	0.13-1.68
Groundwater under influence of surface water	-14.2	0	0-Inf
Surface water	**0.745***	2.11	1.17-3.8
Water purchased	-0.0025	0.998	0.49- 2.03

Table 1: Logistic regression for predictors of LIHWAP funding allocation in disadvantaged communities.

With respect to metric (2), we find that the proportion of eligible households funded in a public water system and the amount of funding per household were significantly influenced by racial/ethnic composition, urbanization, socioeconomic factors and the ownership status of the water system. Specifically, public water systems with higher ratios of average water bills to median household income tend to fund a larger proportion of eligible households and allocate more funding per household ($p < 0.05$). Public water systems with higher unemployment rates were significantly more likely to fund larger proportions of eligible households. In contrast, systems with higher urban population proportions were associated with lower funding rates for eligible households. Notably, water systems serving communities with higher percentages of Black residents also provided more funding, both in terms of the proportion of households funded and the amount per household. As Black households are more likely to participate in federal assistance programs like the Supplemental Nutrition Assistance Program (SNAP)[11], and households currently receiving SNAP benefits automatically qualify for LIHWAP[12], this suggests that using existing programs as eligibility criteria for new assistance programs may help lower barriers to entry. Additionally, privately owned water systems were associated with significantly higher proportions of eligible houses being funded and a greater amount of funding per household compared to other ownership types. This is consistent with prior literature suggesting that privately owned water systems tend to offer more low-income assistance programs overall[13] (Table 2).

Based on findings from other utility assistance programs such as the Low Income Household Energy Assistance Program[14], we hypothesize that low application rates and low rates of assistance may be attributed to factors such as limited awareness, language barriers, misconceptions about eligibility criteria, and the complexity of application processes. We observe that while urban water systems were more likely to participate in LIHWAP, they tended to fund a smaller proportion of eligible households compared to rural systems. This suggests that urban systems may face unique challenges, such as higher population density or administrative hurdles, which could dilute the reach of funding among eligible households. Privately owned water systems outperformed other ownership types in funding eligible households, suggesting that these systems might be benefiting from higher technical, managerial and financial support. To investigate these barriers further, we will utilize qualitative interviews to understand the operational challenges faced by water systems and community-based organizations responsible for managing funding, as well as the perceptions of LIHWAP among households. The interviews will be analyzed using qualitative coding and thematic analysis, and used to inform the development of a survey. The findings from the mixed methods study will be used to ground-truth regression results and provide insights into measures to improve the accessibility of water assistance programs.

	Proportion Eligible Funded			Amount per Household		
Variable	**Coef.**	**Odds Ratio**	**95% CI**	**Coef.**	**Odds Ratio**	**95% CI**
Median Household Income (Scaled)	-0.0002	0.9998	1-1	-0.0050	0.9950	0.99-1
Race						
% Hispanic	0.0002	1.0002	1-1	0.0030	1.0030	1-1.01
% Black	0.0026	1.0026	1-1.01	0.0255	1.0258	1-1.05
% Asian	0.0002	1.0002	1-1	-0.0055|	0.9945	0.98-1
% AI/AN	-0.0016|	0.9984	0.99-1	0.0007	1.0007	0.97-1.04
% Urban	**-0.0013*****	0.9987	1-1	**-0.0125*****	0.9876	0.98-0.99
% Unemployed	0.0021	1.0021	1-1.01	0.0065	1.0065	0.98-1.04
Population served (Scaled)	0.0000	1	1-1	0.0000	1	1-1
Ownership						
Private	**0.0906*****	1.0948	1.06-1.14	**0.7136*****	2.0413	1.42-2.93
Primary Water Source						
Water purchased	0.0297	1.0301	0.92-1.15	0.5512	1.7353	0.59-5.1
Groundwater under influence of surface water	0.0298	1.0302	0.92-1.15	0.1255	1.1337	0.39-3.27
Surface water	-0.0129	0.9872	0.96-1.02	0.0656	1.0678	0.80-1.42
Water purchased	0.0824	1.0859	0.82-1.43	0.0824	1.0859	0.82-1.43

Table 2: Regression coefficients for proportion of eligible households funded and amount of funding per household

Implications

LIHWAP has been identified as a viable model for long-term water affordability programs in the US[15]. Our study provides evidence that in public water systems that provided LIHWAP funding to households, the distribution of benefits was equitable across racial and ethnic groups, with a clear focus on households experiencing the highest water burdens. However, despite these positive outcomes, fewer than 20% of water systems serving disadvantaged communities offered any funding to households, and overall adoption of LIHWAP across the state remained low, even though the majority of water systems were officially enrolled in the program. To address gaps in program access, it is essential to enhance outreach efforts, simplify application processes, and explore tailored strategies for both urban and rural systems, ensuring that all eligible households, particularly in disadvantaged areas, have equal access to the assistance they need. The results from the qualitative portion of this study will provide deeper insights into the underlying barriers to program access and participation. By capturing perspectives of both water utility operators and households facing water burden, we aim to identify actionable strategies to improve program outreach, simplify access, and increase participation among disadvantaged communities. These findings can inform broader efforts to address water affordability challenges across the US, offering valuable lessons for federal policy design and for states looking to implement or refine similar programs.

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