Thesis Project Portfolio

Point of Use Water Treatment Advancement Using Silver and Copper

(Technical Report)

Austerity and Water Quality in Puerto Rico

(STS Research Paper)

An Undergraduate Thesis

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Sociotechnical Synthesis

Introduction

Access to clean drinking water is a worldwide problem. This water crisis is exacerbated by climate change, pollution, and increasing water consumption. Poor quality drinking water leads to the spread of disease, including cholera and typhoid, and to thousands of deaths across the globe. The World Health Organization estimated 829,000 people die each year from diseases related to poor drinking water. My technical and STS research both explore the issues of drinking water and the technologies used to combat water issues.

Technical Project

My technical research explores the advancement of the MadiDrop+, a silver-embedded point-of-use ceramic tablet used for the disinfection of water. This research focuses on adding copper mesh to improve the disinfection efficiency of this technology. In communities that have poor-functioning or no access to water treatment systems, people may rely on point-of-use water treatment (POUWT). These communities may also face issues with mosquitoes whose larvae grow in water. So, in addition to assessing the efficiency of the MadiDrop+ with copper mesh, experiments with copper and silver were conducted to test the larvicidal effects of common drinking water technologies on mosquito larvae.

STS Research

This technical research connects to my STS research which explores the impacts of austerity politics on the quality of water in Puerto Rico. Puerto Rico was chosen as a case study because poor water quality has been caused by its status as a colony and the violence the United States has inflicted upon the archipelago. This paper examines how Puerto Ricans have pushed back against and resisted austerity measures. This research is navigated through the hydropolitics framework, and social movements and mobilized publics framework.

Conclusion

The experiments with mosquitoes and those with MadiDrops provided interesting insight on the effectiveness of copper and silver on killing mosquitoes and as methods of disinfection. The mosquito experiments proved challenging since new eggs had to be hatched for each set, and, thus, provided a variability of results between each batch of larvae. The MadiDrop+ experiments proved to be promising as they showed consistent release of copper and silver in water. The STS research paper also proved to be insightful as there was a clear connection between austerity and water quality in Puerto Rico. Both research projects gave me a deeper understanding of issues regarding water quality.

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