Looking at sachet water consumption in Ghana

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This is a typical package of sachet water, known on the street as "pure water." Credit: Justin Stoler/University of Miami

Many of West Africa's largest cities continue to lag in their provision of piped water to residents. Filling the service gap are plastic water sachets, which have become an important source of drinking water for the region. This industry provides many jobs and improves access to clean

drinking water, yet unintended social and environmental consequences associated with the widespread use of sachet water continues to stir controversy.

A new study by Justin Stoler, assistant professor of Geography and Regional Studies at the University of Miami (UM) College of Arts and Sciences examines the demographics of sachet water usage in Ghana's capital Accra and analyzes the roles that poverty, environment, and social justice play in relation to urban water security. Stoler hopes to guide policy makers on one of the most pressing issues in West Africa—meeting universal drinking water needs.

"My overarching goal is to provide an evidence-based framework for decision-making about the regulation of the sachet water industry, and to make sure that any new policies create the greatest benefits for the people, without further marginalizing the city's most desperate citizens," says Stoler.

The new findings reveal how sachet consumption in Accra has transitioned from higher- to lower-income populations.

"The biggest surprise from a collective body work is how the burden of sachet water dependency falls on the poorest of the poor in Accra's slums," says Stoler, who also holds an appointment in the Department of Epidemiology and Public Health in UM's Miller School of Medicine.

The Accra Metropolitan Area is home to 2.4 million people according to the 2010 census, and an estimated 75 percent of households lack 24-hour water access while 10 percent have no access at all. Unable to distribute water to all piped neighborhoods simultaneously, the government has instituted a water rationing scheme in which some neighborhoods only receive piped water at certain times of specific days. "We study Accra as an example of what can happen to human health in a city experiencing

intense urbanization and population growth with very little urban planning," Stoler says.

This is a sachet water delivery truck -- now a fixture in the landscape of Ghana's urban slums. Credit: Justin Stoler/University of Miami

In Ghana there are many brands of sachet water. The bags are sealed, single, 500 ml plastic sleeves which are filled with water from the municipal system or private wells. But the development comes with its share of problems.

"Sachet water manufacturers pump water from areas with the best water pressure and rationing rules, and by doing so, they are potentially creating water scarcity somewhere down the pipe network," Stoler says.

Once used, sachet wrappers are commonly thrown in city streets and gutters creating an environmental sanitation problem. "In Accra the gutters and storm drains are often filled with trash and get particularly clogged from all the plastic sleeves of discarded sachets and other beverages. This increases the likelihood of flooding and exposure to untreated sewage in many communities," Stoler says.

Sachet water presents many tradeoffs, but it remains an under-studied topic. For the project, the researchers used a 2008-09 community-based population survey of 2,814 Accra women conducted by the Harvard School of Public Health, the University of Ghana at Legon and San Diego State University. The survey broadly inventoried a number of health and welfare characteristics, including water consumption habits and related risks.

The findings are published in the June 19 issue of *PLOS ONE* in an article titled "Drinking Water in Transition: A Multilevel Cross-sectional Analysis of Sachet Water Consumption in Accra." Co-authors of the study are John R. Weeks, distinguished professor of geography at San Diego State University, and Richard Appiah Otoo, geographic information systems office manager at Ghana Urban Water Ltd.

Stoler and his collaborators are expanding their work to include Accra's peripheral urban areas. They will explore the economic impact of water insecurity in the form of "opportunity cost," that is, the educational and job opportunities people forego because of the time and energy they invest in finding clean water.

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