



In Partial Fulfillment of the Requirements for the Degree of

Doctor of Philosophy
Daniel M. Nzengya

Will defend his dissertation

Designing Institutions and Health Education Interventions for Sustainable Supply of Safe Water in Urban Informal Settlements: The Case of Kenya

Abstract

Sub-Saharan Africa has the fastest growing population in the world. Most of this population growth is being absorbed in urban areas, especially within overcrowded informal settlements. Centralized approaches to urban water supply have proved to be seriously deficient, and diarrheal diseases continue to kill more children in urban informal settlements in sub-Saharan Africa than in any other part of the world. In recent years, partnerships between water utilities and informal settlements have been promoted as new models to improve water-service provision. One of these partnership arrangements is the Delegated Management Model (DMM), in which a utility delegates management of infrastructure and service delivery to slum residents.

The goal of this research was to understand how DMM functions and to evaluate its benefits by comparing water services in three informal settlements in Kisumu city, Kenya: two slums where DMM has been implemented, and one, a control, where it has not. The first part of the dissertation, based on interviews with kiosk operators, examines how these operators who manage the infrastructure for extending water supply in the informal settlements have benefitted from DMM. The second part examines how households have benefitted from the implementation of DMM and their perceptions of ways the model could be improved. In the third part of the dissertation, I examine how school-based hygiene interventions could be designed to improve safe water and hygiene knowledge in urban informal settlements. This study compared outcomes of two approaches to hygiene education. The first approach combined messages about safe water-handling and hygiene practices with participatory water testing; the second used hygiene messages alone. A quasi-experimental design with pre- and post-testing was used with 120 middle-school students. An evaluation was conducted one week after the interventions to measure what students had learned. A

second evaluation was conducted 12 months after the interventions to measure students' knowledge retention.

Results of interviews with kiosk operators showed that DMM implementation had created opportunities for diverse actors, including women and young people, to run water kiosks. DMM also lowered water costs and improved provider accountability. However, problems associated with burst pipes and theft and vandalism of water meters and pipes were found to be significantly higher in DMM settlements. Such problems hamper DMM performance and sustainability by increasing the costs of maintaining water-distribution networks, disrupting service, and reducing water quality and user satisfaction with services. Results also showed lack of established standards and monitoring of water delivery points by kiosk water providers; which in turn, led to concerns about unhygienic conditions and the possibility of water contamination during collection. In addition, unhygienic water collection and handling practices on the part of the service users leads to secondary contamination, thus preventing the intended health outcomes of DMM from being realized.

The research findings suggest that: i) regular monitoring of water quality at the kiosks is essential to ensure that the DMM model achieves intended health outcomes, ii) sanitation conditions at kiosk sites need to be regulated to meet minimum hygiene standards, iii) customers need to be educated about the use of safe containers for water collection and water storage at home. Finally, school-based hygiene education could be made more effective by including hands-on water testing by students. The main message from this research is that making a sustainable impact on health and wellbeing of slum residents requires not only building effective partnerships for water delivery, but also paying close attention to the other points of intervention within the water system – including, different ways of providing education about hygiene, and safe collection and storage practices at home.

Friday, May 23, 2014

1pm

WGHL 401

Faculty, students, and the general public are invited.

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