Mortenson Center in Engineering for Developing Communities
UNIVERSITY OF COLORADO **BOULDER**

Research Seminar

Using monitoring data and systems analysis approaches to improve rural water service delivery in low- and middle-income countries

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Date: Tuesday, February 20, 2018
Time: Noon to 1:00pm
Location: ECOT 317

Abstract:

Universal access to basic sanitation and water services and progressive improvements are important for human development and health; and are recognized in local, national, and international policies such as the Sustainable Development Goals (SDGs). New and expanded monitoring will measure progress toward universal access and service improvements. Monitoring data can be analyzed beyond their immediate purpose using systems analysis approaches to answer policy- and program-relevant questions, such as understanding the factors that influence rural water service availability (e.g. functionality, continuity). However, monitoring data are often underused for such service delivery research and there are opportunities to increase the reliability and quality of monitoring. To demonstrate these opportunities, monitoring data from low- and middle-income countries were analyzed using Bayesian networks (BNs) to explore factors influencing water service availability. In Tanzania, Nira handpumps were more functional than Afridev and India Mark II handpumps. In Tanzania, functionality was higher if fees were collected monthly rather than in response to system breakdown. Systems in Nigeria were more likely to be functional if they were used for both human and livestock consumption. In Tanzania, systems managed by private operators were more functional than community-managed systems. In Sierra Leone, damaged pumps, damaged pipes, pump type, and repair speed were most influential on water service availability. The BNs predicted functionality increased from 68% to 89% in Nigeria and from 53% to 68% in Tanzania when best observed conditions were in place. Simple data collection improvements such as the use of standard definitions, quality assurance, and evidence-based survey questions would not add substantial cost or burden and would make monitoring data substantially more valuable for service delivery research. Future research will apply these systems approaches to other SDG-relevant domains, such as improving drinking water safety and environmental conditions in health care facilities. Other models, such as Quantitative Microbial Risk Assessment, will be linked with monitoring data and Bayesian Networks to determine how factors influence service and health outcomes to provide better evidence for decision-makers to guide resource investments and improve health. Future research will be conducted at the science-policy interface to develop these systems analyses into salient, credible, and legitimate evidence products for decision-makers. Improvements to monitoring initiatives and analysis of monitoring data with systems approaches are useful for identifying improvement opportunities and informing evidence-based decision-making for better management, policy, programming, and practice.

Biography:

Ryan Cronk is a post-doctoral research associate with the Water Institute in the Department of Environmental Sciences and Engineering (ESE) at the University of North Carolina at Chapel Hill (UNC). He received a Ph.D. in ESE from UNC in 2017, an M.S. in ESE from UNC in 2013, and a B.S. in Systems Engineering from the University of Virginia in 2009. Ryan's research interests include rural water supply safety and sustainability, environmental conditions in non-household settings (e.g. health care facilities, orphanages, and prisons), and international policy and monitoring for water, sanitation, and hygiene. Ryan uses systems modeling approaches and data from 'cradle-to-cradle' to address these 'wicked' public health engineering problems in low- and middle-income countries.

For seminar information, please contact Amy Javernick-Will at Amy.Javernick@colorado.edu