Monitoring drinking water quality in South Africa: Designing information systems for local needs

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Abstract

In South Africa, the management and monitoring of drinking water quality is governed by policies and regulations based on international standards. Water Service Authorities, which are either municipalities or district municipalities, are required to submit information regarding water quality and the management thereof regularly to the national Blue Drop System (BDS). Since 2009, a trend has emerged in which urban municipalities have been shown to consistently improve their water quality management whilst some of the rural and under-resourced municipalities are falling behind. A major concern has been that rural municipalities are failing to report the required information and are not complying with some of the regulator's requirements that speak to the overall management of water quality monitoring rather than the actual water quality itself. This paper reflects on a case study undertaken in four rural municipalities in South Africa where a cellphone-based information system was implemented to collect information relevant to the municipality. The study was conducted by the Information for Community Oriented Municipal Services (iCOMMS) research team based at the Department of Civil Engineering at the University of Cape Town. The hypothesis for the research was that improved information flow within rural municipalities – from water supplies in outlying areas to the municipal government office – can improve the efficiency of existing monitoring, if the design, development and implementation of such a system are based on collecting appropriate and locally relevant information. Water service authorities at the four field sites managed the process of monitoring in very different ways due to limited resources as well as structural challenges within each government department. The variety of stakeholders involved in water quality monitoring programmes, and the alternative methods and processes used, challenges the current understanding of information system design as well as the notion of developing a single national information system. The decentralisation of national water quality monitoring to municipal level was assessed in this research, which concluded that the BDS was of limited usefulness to water quality monitoring in the rural municipalities partaking in this research.

Keywords: water quality monitoring, information management, Blue Drop System, decentralisation, rural municipalities

INTRODUCTION

Between 1994 and 2012 over 21 million people in South Africa were given access to an improved water source (DWA, 2012), and in 2008 the initiative of Blue Drop Certification tackled the challenge of decentralising the monitoring of water sources (DWA, 2009). The national Government has implemented regulations and policies to deliver safe water to all, but some local municipalities have not necessarily caught up with the national guidelines. This is particularly true for rural communities and municipality structures where water supply is only partially reticulated and treated, and a majority of the population still rely on individual boreholes. The low compliance rate is generally explained using reasons such as under-resourcing, skill shortages, lack of understanding of required standards, lack of intervention to address problem areas, inadequate management, and limitations on finances, assets and fiscal accountability (DWA, 2012).

It is widely accepted that rural areas in South Africa are more difficult to manage and monitor due to the limitations highlighted above, as well as the geographical layout of a dispersed population and the historical set-up. Muller (2007), Atkinson (2009), and Metha (2004) noted that this may be exaggerated by management practices of controlling limited resources, rather than managing policy implementation. Rural authorities are also not always responsive to legislation and regulatory requirements and consequently water quality monitoring of outlying supplies might only be conducted on an ad-hoc basis (DWA, 2012). Such ad-hoc information has very limited impact on the identification and prevention of microbiological contamination or on the overall management of water supplies.

This paper presents findings of a study that investigated the use of a cellphone-based information system which was implemented in 4 rural municipalities in South Africa. The study formed part of the Aquatest project, an international research programme, which was established to develop a low-cost water test for the developing world. It was initiated in 2006 under the European Union Sixth Framework Programme. In 2007 the project secured funding from the Gates Foundation for the period from 2008 to 2012. The project consortium included universities in the UK and US, two US-based non-profit organisations, and the iCOMMS team at the University of Cape Town (University of Bristol, 2012).

During the course of the research it was observed that the apparent inability of rural municipalities to respond to regulations might be closely linked to the structures for decentralising water quality monitoring to local municipalities. The national monitoring systems that have been put in place in

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