

Sri Lankan Experiences on Water Quality Monitoring in Community Managed Water Supply Schemes

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ABSTRACT

The aim of the paper is to highlight activities carried out to resolve the water quality issues effecting community managed rural water supply schemes. In Sri Lanka there are many agencies active in the water supply sector. The National Water Supply & Drainage Board is the major service provider in the sector. In addition there are local authorities, Community Based Organizations (CBOs) and plantation companies are providing water services to urban and rural population. The main implementing partners in the sector are the Ministry of Water Supply & Drainage with the National Water Supply and Drainage Board (NWSDB) as the implementing arm. In a few urban local authority areas piped supplies are maintained by local authorities. In Sri Lanka approximately 25% of the populations which do not get the government service delivery depend on other public and private water supplies and information available is not enough to determine the safety of such supplies. The Ministry of Health and Nutrition has the mandate to regulate public water supplies as well as monitor and prevent out breaks of water borne diseases. Water is mainly abstracted from surface water such as rivers, reservoirs and high yielding bore hole for pipe borne water supply. In the rural sector the ambient water quality is much better than that of the urban sector. Therefore, many agencies have been able to implement small scale community managed schemes with simple treatment efforts. Since, Community Based Organizations (CBOs) are managing rural water schemes, leaders of CBOs were trained and guided in addressing water pollution issues and water quality monitoring.

1. BACK GROUND

Sri Lanka has invested heavily in rural water supplies since 1993 with over 3,400 schemes serving some 3.5 million people. These schemes are owned and managed by local Community Based Organizations (CBOs). At present 9% of drinking water requirement of the country is covered by community managed water schemes.

However the threat of pollution of the water sources providing water to these communities has increased over the years due to poor land and environmental management. Water quality in many of the rural schemes has been degraded from the original quality which was observed at the time of commissioning of these systems. It has been revealed that the solution to this issue would be to augment the water supply systems with the introduction of additional treatment steps such as filtration including chlorination. Since, these schemes are mostly managed by the users it is difficult to generate funds for improvements without external support.

Agencies active in rural and urban water supplies include: The National Water Supply and Drainage Board; Local Government; and CBOs. Urban schemes are served by treated, piped schemes. However, as raw water pollution is increasing nationally due to poor environment management, monitoring water quality in community schemes is seen to be critical to ensure safe drinking water and minimize health risks. In order to resolve this, in 2007 a collaboration was established for water quality surveillance by water and health sector professionals and introduced National Water Quality Surveillance System as a part of the water safety plan according to WHO guide lines.

UNICEF assisted in establishing a national system for sampling, testing, reporting and maintaining access to safe water. WHO (1976) defined such surveillance as "the continuous and vigilant public health assessment and overview of the safety and acceptability of drinking water supplies". The NWQSS's governing principle is that service providers are responsible for delivering safe water, with all service providers verifying that their systems are complying. Each service provider must prepare a Water Safety Plan (WSP), with District Water Quality

Surveillance Committees monitoring implementation. The Ministry of Health (MOH) has overall legal responsibility for the NWQSS and conducts independent surveillance. Although this surveillance system is in place, achieving water quality targets is challenging particularly in CBO managed systems. Regular water quality testing is too expensive for small systems which rely on the income derived from beneficiaries. Moreover, NWSDB laboratories situated mainly in district capitals are inaccessible to remote villages. Therefore, efficient periodic monitoring of water quality in small systems scattered across the country is an institutional challenge. Rapid assessment was done and which showed that CBOs and their consumers are not enthusiastic about water quality testing unless a local water-borne disease outbreak occurs. Moreover, when testing results are below standard, CBOs lack the knowledge and resources for remedial action. To address the lack of knowledge on water quality and their effects, conducted water quality awareness training focusing on CBO leaders and consumers and linking CBOs with local Public Health Inspectors (PHIs) who also help CBOs address water pollution issues at village and household levels. As a result with the implementation of the water quality testing program, CBOs were each encouraged to prepare a simple WSP in a participatory manner, thus enhancing community awareness of water quality. Public Health Inspectors (PHI) of the health department working at field level were entrusted with the responsibilities of attending periodical water quality testing and assists CBOs to solve quality issues of the drinking water in the rural areas.

A WSP is essentially a framework of hazard identification, risk assessment and risk management measures. Since, the bacteriological contamination of water is high in the wet zone and chemical contamination is high in dry zone in Sri Lanka, different strategies have been adopted to monitor the quality of water in community managed water schemes.

The WSP includes all steps in the water supply system including the identification of each element, control measures and monitoring protocols, and provisions in case of catastrophic incidents. Since, water quality is one of the factors which effects to the sustainability of community based water schemes. Ministry of Water supply and drainage took a policy decision to establish the Community Water Trust Fund aiming at giving assistance to the CBOs. National Water Supply and Drainage board laboratory facilities extended their services to the CBO managed water supply schemes to obtain the services through NWSDB.

2. DRINKING WATER POLICY CONCERNS IN WATER QUALITY SURVEILLANCE(WQS)

Policy makers and implementing partners in the water supply and sanitation sector have agreed to establish an institutional mechanism and build capacity for drinking water supply regulation. In the absence of a legal framework for drinking water quality consensus are there to bring regularizing of drinking water under the food Act. Introduction of water safety plans for public water supply in line with the WHO initiative is strongly recommended as the most effective means of consistently ensuring safety of drinking water supplies. Drinking water quality surveillance is “the continuous and vigilant public health assessment and review of the acceptability of drinking water supplies”

WSP encompasses risk assessment and risk management in a more iterative manner from catchments to consumer for consistency assuring the delivery of safe drinking water. It works more on protective than curative reforms for water quality control and is applicable across a wide range of situations from individual systems such as wells, rainwater harvesting systems, small community water supply schemes to large water supply utilities. Securing the water sources for safe yield, applying water treatments to eliminate contaminants, and preventing re-contamination at operational levels and use are the main components targeted in a WSP frame work. Commitments of the District WQS Committees promoted to assess risks from the catchment to consumer and eliminate risk through a collaborative partnership as the scope of the service delivery agencies are limited in managing natural resources such as land and water.

3. MAJOR STEPS IN RECENT TIMES IN ACHIEVING INSTITUTIONAL FRAMEWORK FOR WQS

- Joint cabinet paper to establish collaboration of health and water sectors for water quality regulation
- Improve capacity of NWSDB laboratories at district level to cater all categories of water service delivery
- Collaborative partnership of NWSDB and the Ministry of Health and Nutrition for national and district level WQS systems
- National Steering Committee for WQS chaired by the Secretary Ministry of Water Supply & Drainage established

- Steering Committee for Water Quality Surveillance for health based targets chaired by the secretary of the Ministry of Health
- National Circular issued by Ministry of Health to all regional directors of health to establish DWQSS and Circular by NWSDB for all laboratories to assist in providing free testing of regulatory of samples brought by PHIs from CBO managed schemes
- Implementation of Water Safety Plans.

3.1. Water Safety Plans (WSP)

Water safety plans go beyond periodical testing of residual chlorine at the furthest stand pipe in a water supply distribution system, which was one of the few functions carried out by public water supplies to ensure safety of water in the past. With the current issues related to water and environment a comprehensive approach is essential to ensure that risks are minimized through implementation of WSP. The primary objectives of a WSP in ensuring good drinking-water supply practice are the minimization of contamination of source waters, the reduction or removal of contamination through treatment processes and the prevention of contamination during storage, distribution and handling of drinking-water. These objectives are equally applicable to large piped born drinking-water supplies, small community supplies and domestic systems and are achieved through:

- Development of an understanding of the specific system and its capability to supply water that meets health-based targets;
- Identification of potential sources of contamination and how they can be controlled;
- Validation of control measures employed to control hazards;
- Implementation of a system for monitoring the control measures within the water system;
- Timely corrective actions to ensure that safe water is consistently supplied; and Undertaking verification of drinking-water quality to ensure that the WSP is being implemented correctly and is achieving the performance required to meet relevant national, regional and local water quality standards or objectives.

The frame work will consist of

- System assessment to judge its capacity for safe delivery of supplies through a periodical sanitary survey a check list of items and control means.
- Identification of hazard event that the system is exposed to and the level of risk associated with
- Defining and applying control measures
- Determining the means of monitoring applied control measures and operation identifying critical limits
- Validation of each control measures and critical limits from literature base and experimentation. This includes laboratory analysis.
- Redefining some corrective actions in case the critical limits are not met.
- Verification of control measures and entire WSP under operation for which water quality analysis would be quite helpful.
- Documentation of system's overall management plan to assist normal operations and management during incident conditions
- Establishment of health based targets for microbial and chemical quality of water, which would also be a basis for validation of control measures and verification of entire WSP.
- Rolling program for performance verification and iterating some of the above steps for continued water quality assurance.

4. STATUS OF CURRENT ACTIVITIES

In the Memorandum of Understanding signed in 2005, between the UNICEF and the then Ministry of Urban Development and Water Supply a budget allocation is provided to support the National Water Supply & Drainage Board to upgrade laboratories in order to establish a water quality surveillance system for rural water supplies covering all districts in Sri Lanka. With the assistance of UNICEF, NWSDB has initiated pilot testing of Water Safety Plans in the southern districts in Sri Lanka. Ministry of Health chair a monthly meeting on water quality surveillance focusing on monitoring of epidemiological aspects. Ministry of Water Supply and Drainage took the initiative to establish the National Steering Committee for Water Quality Surveillance.

5. SUMMERY

The rural sector in Sri Lanka, people commonly place more emphasis on water quantity and reliability, rather than water quality, as they have experienced severe hardship from water shortages. Once quantity and reliability targets are achieved, people are more amenable to focusing their concerns on water quality. However, CBOs as voluntary service providers have shown little interest in water quality monitoring largely due to financial constraints, lack of awareness, and poor accessibility to testing laboratories. The systematic approach adopted by decentralized monitoring, and extensive awareness of water quality issues has helped to establish a promising water quality monitoring for community-based rural water supply schemes. National Water Supply and Drainage board has taken steps to assist to CBOs by implementing random Water quality testing program through its exiting Island wide laboratory facilities. In addition to that Ministry of Water Supply and Drainage has established a Community Water Trust Fund to ensure the Water Quality of rural water supply schemes through raising awareness and mobilizing commitment of the CBOs.

