# Abstract Volume

World Water Week
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Water for Development

SIWI WORLD WATER WEEK

# ABSTRACT VOLUME

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## Workshop 1:
## Implementing the SDGs in the Post-2015 Development Agenda

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# Workshop: Implementing the SDGs in the Post-2015 Development Agenda





## Can shared sanitation in slums be adequate sanitation?

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Keywords: sanitation, shared, sdgs

### Introduction and objectives

Shared sanitation was not included as improved sanitation in the MDGs as there were concerns that the hygiene conditions were not adequate. There is an increasing body of evidence to support this. However, there is also recognition that shared sanitation is a necessary step on the pathway to improving access to sanitation, particularly where space is a limitation such as in informal settlements. The objective of this paper is to inform policies on how to improve adequacy of shared sanitation, including public sanitation.

### Methodology approach

This work is based on a 3-year study in 8 informal settlements in Kenya, Rwanda and Uganda. Quantitative data (from 5,500 household surveys) has been used to construct an index for adequate sanitation, based on 22 factors derived from the normative criteria for the human right to sanitation, encompassing availability, accessibility, acceptability, safety and affordability. This is triangulated with qualitative data from focus group discussions (n=83), interviews with local residents and stakeholders (n=99) and deliberative forums (n=3).

### Analysis, results, conclusions and recommendation

Shared and public sanitation facilities provided access to sanitation for the majority of the population in the informal settlements studied: in Kigali and Kisumu 73% and 98% respectively used shared sanitation, in Kampala 46% relied on shared sanitation with a further 42% relying on public latrines. The average number of households sharing ranged from 4.3 in Kigali to 6.8 in Kisumu where 90% had more than 4 households sharing. Lack of space was reported by households as a barrier to installing sanitation. Shared and public sanitation facilities will continue to be necessary in these settlements as the density of households and topographic challenges will limit the development of individual sanitation for household.

Analysis of access to adequate sanitation identified only 3% of households had access to adequate sanitation. The barriers to adequate sanitation varied by city. While shared sanitation can be considered adequate, this analysis identified it was significantly less adequate than private sanitation. Privacy and availability of shared sanitation systems were major barriers to the systems being considered adequate. These were identified in focus group discussions as leading causes of open defecation and use of flying toilets, which were present in all the settlements studied.

Unless sanitation is adequate, people will continue to resort to open defecation, flying toilets and other alternatives that contaminate the environment. This contamination can lead to diarrhoea, stunting and other poor health outcomes. This paper will present analysis of the relative importance of drivers for open defecation (including flying toilets) in urban informal settlements in East Africa. The reconsideration of sanitation in the Sustainable Development Goals needs to consider how we can achieve adequacy of sanitation, including in shared sanitation, and measure how frequently people are resorting to open defecation.

# Water for Development – Capacity Building from Plans to Practice

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Keywords: Capacity Development, IWRM, strategic transboundary planning, sustainable water management, transferability of experiences, indicators

## Introduction and objectives

One of the challenges in making progress on the Millennium Development Goals (and the SDGs, their anticipated successors in the post-2015 context) has been developing capacity building mechanisms to enable countries to implement their plans to reach these goals. Water management, integrated across multiple sectors, requires capacity built and sustainably supported to ensure long-term success of national development plans. As more tools emerge to increase water use efficiency, it is critical that those who most need them know how to use them. This becomes increasingly critical in the transboundary context where encouraging harmonization and managing trade-offs are common challenges.

## Methodology approach

Experiences from the Nile Basin and other transboundary river systems provide key insights on specific steps needed to build capacity to meet water related MDGs. These experiences inform the case study of the Kura River Strategic Action Plan (SAP) for Azerbaijan and Georgia. These outline specific steps and stages required to sustainably increase the capacity across multiple sectors. This focuses on integrated multi-sectoral water resources management capacity building for improved food, energy, water and environmental security. These efforts target public and governmental sectors, the private sector and civil society and are gauged by indicators to measure baselines and progress.

## Analysis, results, conclusions and recommendation

The experiences presented are from the UNDP-GEF Kura Aras Project. The previous phase conducted baseline capacity building trainings in IWRM for 62 rising decision-makers across the region, with more than 72 hours of country and basin specific IWRM curriculum topics. This initial effort measured baseline pre- and post training results. The training curriculum, developed and conducted by international experts emerged from a wide range of IWRM Case studies from Europe, Africa, the Middle East, the Caribbean, and Asia, and featured national experts to increase relevance to the participants. Subsequently, UNDP-GEF supported the countries of Azerbaijan and Georgia to develop nationally based IWRM Plans that served as a foundation for the regionally agreed SAP.

The SAP implementation features increased IWRM capacity building efforts to enable those in professional and civil society positions to implement their national and regional plans. In addition to reviewing the initial IWRM trainings, this paper outlines the specific steps necessary to build in-depth capacity for sustainable water management across sectoral stakeholder groups. This includes increasing the use and understanding of technological tools, strategies for empowered awareness raising, and institutionalizing shared learning and experience exchanges. In-depth aspects for using mathematical models for water resources management, the use of decision support systems, GIS applications, ecological, social, gender, economic valuation of water services, and political approaches for sustainable water management are applied to increase the scope and scale of stakeholder involvement and investment.

This is carefully monitored with specific indicators to gauge progress. Lessons learned are carefully tracked to benefit from successes and failures in the application of the integrated capacity building efforts. An adaptive approach is presented to continuously update and enhance the capacity building plans based on analytical assessment of the results of each phase of these plans to increase transferability of the approach used in the Kura.

# Innovative sanitation financing to make Indian cities open defecation

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Keywords: Sanitation, Toilet, Open defecation, Urban, Finance

## Introduction and objectives

The post-2015 development agenda includes a focus on eliminating open defecation. The Government of India has also set an ambitious goal of eliminating open defecation by 2019 reflecting importance of sanitation articulated by the new Prime Minister as "toilets first, temples later". For cities this implies reaching out to 15 million households that do not have toilets in their homes and requires an estimated investment of over USD7.4 billion at an average cost of USD500 per toilet. Large scale surveys in two Indian states suggest that the principal reasons for lack of own toilets are lack of space and affordability.

## Methodology approach

A key difference in urban sanitation is that demand for sanitation does exist. However, to achieve universal coverage in 5 years requires addressing the issues of space constraints and affordability. Our studies suggest that innovative solutions using group housing are possible to overcome space constraints. However, affordability constraint cannot be tackled simply with subsidies. Subsidies at this scale are fiscally not sustainable, and equally importantly, can distort demand and result in leakages. Thus a demand-led approach is necessary with partial incentive subsidy to unlock demand, and creating improved access to credit for households to ensure affordable access.

## Analysis, results, conclusions and recommendation

Our ongoing work in cities in a highly urbanized Indian state suggests several innovative finance options: a) credit to households by commercial lenders such as housing finance institutions and microfinance institutions that see a potentially large market among urban households, b) community based systems such as self-help groups to provide toilet credit to their members, c) local government own funds to support additional assistance to weaker sections, d) funds from the corporate sector as part of the mandated 2% of profits to be used as Corporate Social Responsibility (CSR), e) new platforms for crowdfunding to attract funding for sanitation, and f) tapping the new breed of social investors willing to forgo some returns on investment to ensure social impacts.

Tapping these new sources will require several policy changes. An appropriate institutional framework will be needed to attract these new lenders and investors – possibly at two levels: a development impact fund at national /state level to mobilize debt funds for on-lending at affordable costs and a City Sanitation fund at state or city level to meet support costs for city government and to provide partial subsidies to households. We are currently working at both these levels to explore the possibility of setting up these mechanisms.

Despite the ambitious targets, government funds available for eliminating open defecation are only 20% of total investment suggesting the need for leveraging. The new resources, if used well, can also help ensure greater accountability and improved outcomes in terms of delivery and use of toilets.

For implementation, local governments will play a crucial role. Their rather limited capacities necessitate a supporting ecosystem to be developed. While innovative funding is only one part of such an ecosystem, it can play a major role in mobilising communities and unlocking demand for improved sanitation.

# Building institutional capacity for water quality monitoring in Sub-Saharan Africa

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Keywords: Monitoring, water quality, institutional capacity, sub-Saharan Africa, post-2015 sustainable development goals

## Introduction and objectives

Water quality monitoring is essential for ensuring the safety of drinking water supplies, verifying water treatment efforts, and measuring progress towards national and international safe drinking water goals. In almost all countries in sub-Saharan Africa, national policies (often based on WHO guidelines) legally mandate routine water quality testing; however, microbial water quality testing in low-resource settings remains limited. As a result, data are not available to guide water quality management, and waterborne disease transmission remains high. To address these issues, we explored building local institutional capacity for water testing programs to strengthen national water quality monitoring across sub-Saharan Africa.

## Methodology approach

The Monitoring for Safe Water (MfSW) program is an initiative to increase access to safe drinking water in sub-Saharan Africa through improved testing and management of water quality. We first collected retrospective microbial water quality data from 72 water suppliers and public health agencies covering over 66 million people across 10 countries. We then selected 26 of these institutions to participate in the MfSW program, which provided financial incentives to build local capacity of monitoring programs. For over two years, we collected and analyzed quantitative data on institutional performance and qualitative data on the constraints and challenges to testing.

## Analysis, results, conclusions and recommendation

First, we established the current status of microbial water quality testing in sub-Saharan Africa. Almost all institutions (99%, 71/72) reported some type of water quality testing and 87% (60/69) reported some microbial testing in the past year. Additionally, most of the countries (7/10) had established national drinking water standards that specified microbial testing requirements; the remaining three countries relied upon WHO Guidelines. However, despite established regulations, only 44% of institutions met their national standards for the frequency of microbial tests conducted annually. Similarly as most national standards are based on WHO guidelines, only 44% of institutions met WHO guidelines for testing frequency.

Why doesn't microbial water quality testing meet regulatory requirements? To explore this further, we then provided financial incentives and evaluated institutional testing performance. By collecting monthly data of microbial testing results from 26 institutions over two years (>25,000 data points), we observed variability in testing performance in terms of meeting institutional targets and testing frequency. This variability allowed us to compare testing performance with hypothesized constraints related to equipment, training, transport, personnel, accountability, budgeting, and other factors.

Through this evaluation, we developed an Institutional Capacity Assessment tool that uses a rigorous scoring system to evaluate institutional water quality monitoring programs.

This Institutional Capacity Assessment tool identifies five enabling factors that are essential for water quality testing, each with distinct elements for scoring on organizational capacity:

1. Institutional Accountability
2. Institutional Capacity
3. Program Structure
4. Financial Management
5. Access to Equipment and Services

Overall, we have found that adequate microbial quality testing is possible in low-resource settings sub-Saharan Africa. Institutional water quality testing programs can be evaluated and improved using the developed Institutional Capacity Assessment tool. Lastly, institutional accountability is essential for successful water quality monitoring programs.

# Monitoring WASH in health centre and schools for sustainable results

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Keywords: WASH, monitoring, post-2015, SDGs

## Introduction and objectives

The formulation of the post-2015 SDG-agenda is in its final stage. The provision of water, sanitation and hygiene (WASH) services at household level are clearly addressed in the latest proposals, but the provision of WASH services in schools, health centres, prisons, refugee camps and at the workplace is not. Currently, 38% of health centres and 31% of schools in developing countries don't have access to an improved water source. This abstract shows a rationale for the inclusion of extra household monitoring for WASH in the post-2015 development agenda, and includes a number of suggested indicators.

## Methodology approach

People not only live in their home, but also go to school, work, hospital, prison or other institutions. Health risks can emerge in any of these setting. However, major source of health risks are found in hospitals and health clinics.

Two example projects are chosen: one around WASH in health centres in Tanzania and one around WASH in schools in Uganda. The results of the two projects show the impact of WASH facilities on health. In both cases, random sample questionnaires have been used to gather empirical data. From the example projects, the most relevant and cost-effective indicators have been formulated.

## Analysis, results, conclusions and recommendation

In central-Tanzania 100 primary health facilities are currently being upgraded with water supply and sanitation systems. This intervention is aimed to reduce the high risk of infection transmission and improve quality of care in health facilities. During the inception phase 186 health centres have been visited of which 100 centres are chosen through the FIETS sustainability model. This model includes Financial, Institutional, Environmental, Technical and Social sustainability. The 100 highest ranking health centres are assumed to be having the highest impact on society and the highest likelihood to have a sustainable hence durable outcome.

In seven districts in Uganda a random samplings of SNV primary schools was carried out by IRC. The sample size was 200 questionnaires with a focus specific target groups, namely: girl pupils, senior women teachers, and senior head teachers were administrated. Based on the study, menstruating school girls are shown to be missing 10% of all school days per year. The results of the study reflect that one key means of keeping girls in primary school is the provision of better menstrual management materials and facilities. If not addressed properly menstrual hygiene management will not only lead to more girls missing school, but can potentially cause an in increase in the number of girls dropping out of school altogether. Beyond showing health impact within specific recently implemented projects, several indicators have been developed that are relevant, measurable and cost-effective. These include:

- Gender disaggregated toilets with bins with lid in girls' washrooms for WASH in schools.
- Basic drinking water service of 5 litres per day per patient and staff from a functional water source on the health centre premises.

The numerous other indicators developed for both health care facilities and schools will be described in the full paper.

# Capacity Building Towards Sustainable Cotton Cultivation: Water Footprint Reduction Strategies


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Keywords: Water Footprint, Cotton, Sustainability, India, Agricultural Practises


## Introduction and objectives

Cotton is a major natural fibre for human consumption and comprises approximately half of all textiles. Its production employs almost 7% of all labour in developing nations and occupies 2.5% of earth's arable land while consuming 25% of all agrochemicals. Naturally, it also has an enormous impact on freshwater resources and therefore sustainable cotton production is as critical to meeting the SDG's as it is to the textile industry. To develop a sustainable water footprint strategy for C&A's supply-chain, a Water Footprint Assessment (WFA) was conducted for cotton cultivation in three states of India: Gujarat, Maharashtra and Madhya Pradesh.

## Methodology approach

India is the largest cotton producer in the world and C&A sources the majority of its cotton from these three states, which also produce nearly half of India's cotton. This study evaluated the consumptive water use (blue and green water footprints) and water pollution (grey water footprint) of three agricultural practices: conventional, organic and REEL (Responsible Environment Enhanced Livelihoods based on integrated pest management). Data on water use, fertiliser and pesticide applications in the growing seasons of 2012-2014 were collected from 1150 farms distributed across the three states.

## Analysis, results, conclusions and recommendation

The results show that the water footprint of cotton cultivation varies depending on farming practices, climate and socio-economic factors. On average, conventional farms had the highest total water footprint per ton of cotton produced, whilst REEL farms had the lowest. The grey water footprint, primarily attributed to pesticide application, is the largest component of the total water footprint with the result that organic cotton has on average the lowest grey water footprint. The blue water footprint is comparatively small in all cases, as the majority of production is dependent on green water from monsoon rains. Within these categories of practices was a wide variation between states, with less developed Madhya Pradesh farms performing poorly in comparison to more advanced Gujarat.

Through this analysis of farm level data, agricultural practises were identified that could reduce the water footprint while maintaining the livelihood of farmers, such as the REEL programme, where the efficacy of capacity building among farmers was demonstrated. Both organic and REEL farms benefitted by reducing their input costs while increasing their revenue through higher market prices and increased yield.

Responding to the grey water footprint's large share of the total water footprint, training farmers in alternatives to conventional pesticides is a critical step toward improving water quality. This shift, together with better soil and crop management, more efficient irrigation technologies, mulching and timing of planting, cotton farmers can improve their livelihood, while contributing to more sustainable water use. Water Footprint Assessment highlights the transitions needed and this study demonstrated the need to increase the capacity of cotton farmers in India to use water efficiently and to have improved income, thus directly working towards the SDG's.

# National strategies for Water Sector Capacity Development: Colombia, Indonesia, Uganda


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Keywords: capacity development, national strategy, leadership, action research


## Introduction and objectives

The proposed Sustainable Development Goals present a paradigmatic shift in their attention to implementation considerations, with capacity development at their core. In order to overcome a 'patch work' of capacity development efforts, national strategies for water sector capacity development are emerging as a coordinating framework. Some countries have already embarked on developing and implementing such strategies, while others are only at the beginning, deliberating their necessity. How can national strategies for water sector capacity development be developed and implemented, with high-level political buy-in and involvement from multiple actors in order to ensure sustained, adequate human, organisational and institutional capacity?

## Methodology approach

Drawing on policy and strategy development theories in combination with insights from leadership literature, we developed a draft conceptual framework to verify on the basis of empirical research. For that purpose, three countries from three different continents (Asia, Africa and Latin America) were selected for action research, namely Indonesia, Uganda and Colombia. In-country events with a broad range of national stakeholders were held in 2014 and 2015 for supporting, and reflecting upon, the national processes of developing and/or implementing strategies targeted at water (and environment) sector capacity development. The resulting findings were complemented by desk research of historical strategy developments.

## Analysis, results, conclusions and recommendation

Each of the three cases has its own set of physical (geographic conditions and water resources, exposure to climate change risks), socio-economic (% and growth rural/urban population, economic growth, GDP per capita, education system performance, etc.) and political parameters. Within and cross- case analyses revealed the stage of strategy development as well as the local dynamics of each case that lead to the current progress. With respect to the development and implementation of a capacity development (CD) strategy, Uganda is at the most advanced stage, with a completed strategy and pilot implementations already taking place in selected sub-sectors; this is followed by Indonesia's draft strategy development (at ministerial level) and up-scaling efforts; finally, although a comprehensive policy for Integrated Water Resources Management is in place in Colombia that pays attention to institutional capacity, the development of an all-embracing CD strategy is still in a deliberation phase. Progress towards national CD strategies seems to be strongly related to the countries' dependence on foreign aid and technical assistance, putting the least developed among this sample (Uganda) in the lead.

Careful deliberation (and strategic CD efforts!) will be required to ensure longer term leadership for the national CD strategy within the country, as well as its sustainable implementation and updating. Moreover, local culture seems to play a very influential role in defining the type of capacity 'gap' that is most salient and the extent to which this can be addressed by a national CD strategy. Based on our findings, we propose guidelines for the development and implementation of water sector CD strategies that are intended as a means to help develop capacity at various levels (individual, organisational, enabling environment, civil society) and among all stakeholders (private and public sector, non-governmental, civil) in a concerted and sustainable way, for the water sector and beyond.

# Implementing, monitoring and financing the SDG in rural Africa

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Keywords: rural water services, handpumps, sustainable development, monitoring, mobile payments

## Introduction and objectives

Implementing the SDG for universal rural water services in Africa requires linking institutional, operational and financial transformations. We report on a study in Kitui County, Kenya, that has operationally tested a new model based on an innovative monitoring system. This has produced dramatic improvements in water service delivery. The model focuses on improving the performance of rural handpumps that serve around 200 million rural Africans. The feasible transition from a pilot study to a viable business model is illustrated in changes in user payment behaviours contingent on operational efficiency. The model is replicable and we illustrate wider uptake across Kenya.

## Methodology approach

In 2012, handpumps in Kitui County, Kenya, were fitted with transmitters which automatically send daily usage data. Baseline surveys, focus groups, workshops and interviews were conducted with government, donors, private sector and communities to design and monitor the pilot. In 2013, a professionalised maintenance system was introduced using the data to trigger maintenance responses. In 2014, a mobile payment system for maintenance services was designed to reflect handpump users' payment preferences. New indicators have been designed based on data flows to monitor service reliability, water demand, unit cost of water production and revenue collection rates.

## Analysis, results, conclusions and recommendation

Results of this study provide new evidence suggesting that institutional, operational and financial challenges in rural water provision may be addressed through data-driven professionalised maintenance services. The findings of this study include (a) a ten-fold reduction in handpump downtime to under three days; (b) a fairer and more flexible payment model contingent on service delivery; (c) new and objective indicators to guide rural water infrastructure investments and regulatory reform.

Following the 2013 pilot, communities were consulted on a variable tariff based on observed usage or priority use (schools, clinics). Handpump committees agreed to a rolling, one-year maintenance contract with a new and locally-based maintenance service company. The contract between communities and the maintenance service provider requires monthly payments based on long-term handpump usage levels that are paid through the mobile payment platform, M-Pesa. The maintenance service provider guarantees to repair breakdowns within three days with penalties for under-performance.

The model reduces operational and financial risks through institutional innovations. Communities benefit from lower average repair costs and avoidance of unpredictable, high-cost repair events. The latter can leave handpumps unrepaired for many months, or abandoned, wasting capital investments and forcing people to search for more distant and less safe water sources. A long-term financial system is being developed using results-based financing mechanisms linked to the transparent and regular flow of performance metrics. Government and donors can monitor their investments to promote value for money and social inclusivity.

New indicators for rural water service delivery are informing national water services regulation in Kenya. This offers a pathway to regulate and improve water service delivery for the majority rural population, who have the lowest levels of improved water access. A larger programme in Kwale County now reaches over 40,000 people with similar or better results.

# Improved Water Use Efficiency in Irrigation: Role of Water User Associations


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Keywords: Water User associations, Water Usage Efficiencies, Participatory Irrigation Management, Data Envelopment Analysis


## Introduction and objectives

The Agriculture Sector remains the largest consumer of water globally.Sustainable food productions depend on irrigation, and hence, improved water usage is critical in the sector. However, efficiencies of water usage in Irrigation sector are not determined and remain unknown in India.

Large Irrigation projects in India are now promoting formations of Water Users Associations (WUAs) to encourage Participatory Irrigation Management. However, benefits to WUAs are not linked with their water usage efficiencies, and hence improved water usage is not on the agenda of farmers. This paper evolves a framework to measure efficiencies of WUAs taking a real-life case study.

## Methodology approach

The paper establishes the need for measuring water usage efficiencies in Irrigation Sector, and develops a Data Envelopment Analysis (DEA) based framework for exploring irrigation efficiencies based on identified indicators.This approach is applied to a major Irrigation project by employing DEA based framework across a number of WUAs which helps identify the best practices within any project and estimates the quantum of possible savings of water. By linking water usage efficiency results to the incentives of farmers including their subsidies and water tariffs applicable to their respective WUAs, competition can be generated amongst WUAs to become progressively water effective.

## Analysis, results, conclusions and recommendation

Agriculture water usage is vital in developing economies like India where more than a billion people need improved food security. Efficient usage water would imply that irrigation projects be assessed for water usage effectivities, something that is non-existent in India so that the inefficiencies have become systemic and deep-rooted.

In large Indian irrigation schemes, Water User Associations are constituted to encourage participatory management in securing equitable water distributions. Constituted over populations of 100-1000 users, WUA General Body includes farmers and their wives as members. Demographic area covered by a WUA is a hydrological boundary, normally 100-2000 ha.

DEA study conducted at WUA level for Tawa Irrigation Project in Madhya Pradesh State showed that two-thirds of the WUAs were performing poorly, thereby highlighting necessity of identifying best practices to be replicated. DEA analysis also showed increasing returns-to-scale implying that a change of sizes of WUAs would yield greater outputs. Thus, optimal sizing of WUAs through restructuring is critical to harnessing efficiencies.

Another important finding was that cost-expenditures can be minimized by following best practices, and resultant savings may be deployed to further refine operation, resulting in incremental efficiency gains. Since, currently the tariffs are charged on per hectare basis for various crop types as fixed by the Government, the revenue has no linkage with water usage efficiencies. It is suggested that tariffs charged be linked to water usage efficiencies as a matter of policy.

The study establishes the significance of measuring efficiencies for WUAs, and shows how analysis can identify best practices and areas of improvement, set efficiency targets, etc. helping the Regulators to introduce scientific tariffs and enable restructuring of WUAs. It is expected that the work will be of significance to various stakeholders including policy makers, regulatory authorities, funding Institutions, and the WUAs.

# Do global monitoring frameworks reflect water quality in sub-Saharan Africa?

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Keywords: water quality, post-2015 sustainable development goals, sub-Saharan Africa, rural water quality, urban water quality

## Introduction and objectives

Public health surveillance agencies and water suppliers are institutions that are regulated to test water quality. Understanding the extent and usefulness of their water quality data can inform development of indicators of the Sustainable Development Goals. Through the Monitoring for Safe Water (MfSW) program, we have collected data from 19 water utilities and 18 public health surveillance agencies in nine countries in sub-Saharan Africa. Raw data provided directly from these institutions allows us to compare existing frameworks for understanding water safety.

## Methodology approach

Through MfSW, we have collected microbial and physico-chemical data from drinking water sources from institutions regulated to perform testing. These data include: 1) retrospective data from 2011-2013 of 44,000 tests for fecal indicator bacteria (FIB), 45,000 tests for free chlorine, and 23,000 tests for turbidity; and 2) ongoing monthly data from 26 institutions between 2013-2014 of 27,000 tests for FIB, 11,000 tests for free chlorine, and 17,000 tests for turbidity. We define FIB as a positive fecal coliform, E. coli, or H2S test. To our knowledge, this is one of the largest datasets of water quality information for sub-Saharan Africa.

## Analysis, results, conclusions and recommendation

65% of the microbial samples in the data set were collected by water suppliers and 35% by health surveillance agencies (n=65842). About three quarters of the samples (69%) in the microbial data were collected from distribution systems (including consumer taps, reservoirs, and treatment plants), while the remaining data were collected from non-piped sources, including wells, springs, household storage containers, rainwater tanks, and surface water.

From samples collected from pipe networks, 3% (n=26,068) were positive for fecal indicator bacteria. 31% (n= 23,784) of piped network samples were below the minimum guideline of 0.2 mg/L free chlorine. Free chlorine concentrations were significantly correlated with presence of fecal indicator bacteria ($p<0.01$, Wilcox rank-sum). From samples collected at non-piped sources, 33% (n= 15,867) were positive for fecal indicator bacteria.

We found that the data generally supported the JMP definitions though not always. 83% of unimproved sources (n=1,764) compared to 8% of improved sources (n=34,606) were positive for FIB; however, most (90%) of samples from improved sources represented piped water supplies. Using data from only non-piped sources, 38% of improved sources (n=3,437) were positive for fecal indicator bacteria.

These results confirm previous findings that, while improved sources are more likely to provide safe water, they do not always provide safe water.

Similarly, analysis of the water quality data confirms the hierarchy proposed in the Joint Monitoring Project's "water ladder" approach, where source types are grouped into "piped on premises", "other improved", "unimproved" and "surface water". However, while the differences between these categories are significant when aggregating data from all countries, the hierarchy is not necessarily consistent when examining data within individual institutions. These results suggest that existing frameworks for understanding access to safe water are useful on a continent- or regional-scale, however, they are not useful indicators for local agencies for planning and investment purposes.

# Multi-track 'non-subsidy'approach for an enabling environment towards WASH sustainability

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Keywords: behaviour change, community-based sanitation, enabling environment, multi-stakeholders

## Introduction and objectives

Indonesia is working towards the universal access to water and sanitation in 2019. To do this, the government issued a national policy of STBM 5 pillars. STBM is the Indonesian adaptation of CLTS (Community Led Total Sanitation), and consists of five pillars:

1. open defecation free
2. handwashing with soap and running water at critical moments
3. water treatment and safe storage
4. household solid waste management
5. household liquid waste management

Through a 5-year programme called "SHAW", Simavi strives to create an enabling environment for the communities in nine districts of Eastern Indonesia to institutionalise the STBM 5 pillars.

## Methodology approach

Simavi and five local implementing partners adopted a multi-track approach called the SHAW-Flow. We work at four different levels (district, sub-district, village, and hamlet), with government structures as well as the communities, and at all phases of the programe, in order to establish an environment which enables sustainable routines of improved behaviour.

The experience of SHAW will be presented to show how and why this approach has been successful in the targeted districts (rural and peri-urban), even without an initial subsidy. Several evidence-based results will be highlighted through beneficiaries testimonials, cost and benefit analysis, and replication strategy.

## Analysis, results, conclusions and recommendation

When SHAW Programme started in 2010, the STBM 5 pillars was somehow still largely unknown, despite it being a national policy. The government and most organisations were implementing only some of the pillars – usually pillar 1 and 2. Many interpreted the policy in terms of highly subsidised physical infrastructure of building toilets to stop open defecation. However due to the lack of sanitation education, the communities often slip back to their unhealthy behaviour despite having toilet facilities and water supply.

SHAW engages the communities to practice the five STBM pillars without providing any initial subsidy, which in turn creates demand for improved WASH facilities. Parallel to this, we actively advocate the local government to ensure they respond to this demand.

At the community level, we reach out to each household and encourage them to want and maintain a healthy living environment – including paying for services. We work with around 20,000 village volunteers who go house to house to motivate the communities and monitor the improved behaviour and practices. All this activities require no cost from SHAW. Once the communities practice an improved behaviour and demand some facilities to support this (i.e. running water for handwashing), the SHAW's partners will then hold discussions to find an appropriate solution. This might include possibilities for some assistance from SHAW.

At the government level , we work with the local government to put STBM agenda into their strategic plan and budget for the institutionalisation of STBM in the long run. We also involve other government institutions such as the community health centres and schools to adopt STBM.

In the end the approach adopted by SHAW is an example of how a community-based non-subsidy WASH programme has successfully reached around 1.5 million people and 1,000 villages to be declared 100% STBM.

## Stockholm International Water Institute

The Stockholm International Water Institute (SIWI) is a policy institute that contributes to international efforts to combat the world's escalating water crisis. SIWI develops and promotes future-oriented and knowledge–integrated policies, towards sustainable use of the world's water resources leading to sustainable development and poverty eradication.

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