THE REPUBLIC OF UGANDA

Appropriate Water and Sanitation Technologies: Challenges of meeting Uganda's demands

Overview

The water sub-sector aims at ensuring availability and sustainable management of water and sanitation for all. This is in line with Vision 2040, the National Development Plan II and the NRM Manifesto (2011-2016) which puts high emphasis on the agenda water supply and sanitation infrastructure for sustainable economic growth and economic transformation for improved wellbeing of all Ugandans by 2030. Government's investment into the sector on average has been at 3% of the National Budget since the FY 2009/10 yet the population growth rate is 3.03% (NPHC 2014).

The water sub-sector allocation priorities are focusing on ensuring sustainability of the sector investments and cost effective implementation. This implies developing water and sanitation services that are effective, efficient, equitable and sustainable. This is done through rehabilitation, expansion and construction of different technologies inclusive of piped water schemes, borehole drilling, gravity flow schemes, shallow wells, springs, rainwater harvesting, dams, valley tanks, bulk water transfers and sewerage facilities in urban centres. The overall guiding principle is "some for all rather than more for some" with an equity principle of serving those in need first.

Key Issues

1. Safe water coverage has stagnated at 65% and MDG targets were not met.
2. Conventional cheap technologies have been exhausted.
3. There is little adaptation of new WASH technologies by beneficiaries partly because of lack of knowledge.
4. There is a big gap between funding and sector targets given the rising costs of implementation.
5. Poor functionality of sources due to technical breakdown (36.1%), poor water quality (18.4%) and low yields (17.3%).
6. The donors mainly determine the type of technology adopted.

Introduction

The criteria for choice of technology depends on the yield of the source, environmental and social impacts, financial and economic cost, area to be served; and the unit cost of the overall project. However, in most cases the donors determine the choice thus users have limited influence on technological innovations. Table 1 reflects the water and sanitation trends.

Table 1: Water and Sanitation sub-sector performance indicators

Golden Indicator		Achievement over FY					Target 14/15
		10/11	11/12	12/13	13/14	14/15	
Access	Rural	65	64	64	64	65	77
	Urban	66	69	70	73	73	100
Functio-nality	Rural	83	83	84	85	88	90
	Urban	91	84	87	89	92	95
	WfP	24	67	71	74	75	90

Source: Uganda Water Atlas 2016 database

Conventional technologies

Protected springs

This is the predominant water source technology in rural areas. It is relatively cheap, easy to construct using locally available materials and labour; simple to operate and maintain. Most springs are poorly maintained with poor hygienic conditions and flooding of the collection platforms.

Shallow wells

Shallow wells are located in areas where the water is drawn from close to the ground surface. They are relatively cheap and easy to construct. However, they are prone to contamination if not properly constructed.

Boreholes

This is from a hole drilled into the ground to extract ground water. They are expensive to construct and the right spare parts are not easily available in some cases.

Rainwater Harvesting Tanks (RWHTs)

The water is from a catchment area, usually a roof or a rock and stored in a tank. Construction comprises of plastic, corrugated sheet, ferro cement tanks using bricks or blocks. It is good for water stressed areas. Operation and management is at household level. RWHTs are costly for individuals.

Valley Tanks and Dams

Water is mainly collected from surface runoff at the bottom of a valley into a valley tank. Once water is stored using an embankment or dam, it becomes a valley dam. These don't provide safe drinking water.

Yard taps and water kiosks on piped water systems

Yard taps are water faucets connected to a piped water supply. Yard taps and kiosks supply water to the urban poor communities that are not able to afford household connections.

Traditional pit latrines

A pit of 2m or more in depth is dug and covered with timber, log or concrete slab with an opening cover on which a person squats. This is relatively cheap because it uses cheap labour and locally available materials. It may have a bad smell and attract flies, especially when wet. The pits are prone to collapse and the rocky ground makes it very hard and expensive to excavate.

Ventilated Improved Pit (VIP) Latrines

The VIP latrine reduces odour and prevent flies from entering the toilet. This type of latrine is promoted by the government in institutions such as schools, health centres and government premises in rural area. They not affordable to many people.

Population served

The protected spring serves a population of 200, shallow wells and deep borehole 300 each, kiosk 150, Rainwater Harvesting Tanks between three to six, house connection six and institutional connection 100 persons.

MWE SPR-2015

Sector initiatives

The Ministry of Water and Environment (MWE) has taken steps albeit, some challenges towards improving the water and sanitation levels in the country. The Hand Pump Mechanic Associations were set up to improve the functionality of hand pumps. The Appropriate Technology Centre (ATC) handles the following:

- Undertakes innovative applied research and development in appropriate technologies and approaches for water and sanitation.
- Builds the profile of appropriate technology for sustainable water supply and sanitation options by popularizing the appropriate technology practices.
- Accelerates public private investment through innovative financing mechanisms and demonstration of acceptable innovative practices.

Table 2: Summary of ongoing Technology research by ATC

Technology Type/ name	Advantages
SODIS technology	Used for purification of drinking water among the rural poor
EMAS Tank and Pump	A low cost underground rainwater harvesting tank, easy to construct, operate and maintain. Constructed by plastering the earth after excavation without brickwork.
Bucket-kit drip irrigation	A low cost method - materials are locally available that delivers adequate amounts of water to crops in an efficient way
Eco-toilets (Urine Diversion Dry Toilet , Fossa Alterna, Composting Toilet, AberLoo the Tiger Toilet)	Have capacity to recycle nutrients in human waste (urine and faeces) as fertilizer and manure though difficult to adopt and maintain.

Source: MWE/ATC

Functionality

The functionality of water facilities has remained at a level of about 82% over the last 4 years despite considerable investments in the Community Based Management System and capacity building programs. This too affects how many people access safe water. Table 3 shows functionality status of different technologies.

Table 3: Functionality of water facilities by June 2015

Tech-nology	Func-tional	Non-Func-tional	Total	Func-tion-ality (%)
Springs	23,910	3,002	26,912	89
Shallow Well	15,196	4,117	19,313	79
Deep Borehole	27,717	4,377	32,094	86
RWHTs	16,504	2,310	18,814	88
Dam	289	85	374	77
Deep Borehole	610	107	717	85
PSPs	7,246	1,355	8,601	84
Deep Borehole	818	108	926	88
Yard Taps	5,955	892	6,847	87
Total	97,138	16,160	113,298	

Source: Uganda Water Atlas 2016 database

Reasons for non-functionality

Over the years major reasons for non-functionality include Dry/ Low yielding sources (17.3%), Technical breakdown (36.1%), Water quality (18.4%) which the sector needs to improve (MWE 2015).

Conclusion

Amidst the glaring water and sanitation needs to meet the Sustainable Development Goal "clean water and sanitation" the existing technologies have a number of limitations. The cheaper options have been exhausted forcing the sector

to go for expensive ones like bulk water supply. Research and innovations are being done to help adopt appropriate technologies.

Hindrances to sector needs

1) The high cost of replacements, renewals and major expansions in areas with unique geological and topographical characteristics.
2) The exhausted utilization of cheaper water sources leaving expensive systems such as deep boreholes and piped systems.
3) Poor siting and inadequate designs leading to system failures and drying up the main source of raw water.
4) Inability to establish an effective regulatory mechanism for the urban water and sewerage protection services.
5) An insufficient/vibrant, competitive and cost effective private sector for construction operation and post construction maintenance of facilities.

Recommendations

1) The sector should work towards cost effective implementation through cost reviews and promotion of locally available materials.
2) The MWE should harmonize and rationally plan for efficient provision of water and sanitation services.
3) The MWE should carry out comprehensive designs prior to project initiations.
4) The MWE could create an independent regulation unit for private operators to avoid compromising equal affordable and physical access to sufficient safe water and sanitation.
5) Create a conducive environment for private sector thrive develop, operate and maintain water and sanitation facilities.

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Budget Monitoring and Accountability Unit (BMAU)

Ministry of Finance Planning and Economic Development

P. O. Box 8147 Kampala

www.finance.go.ug