Self Supply Initiative

Topic:

Short Paper

Title: The Challenges of self Supply – A Case of a family in Kitezi-Kabaga estate

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Abstract/Summary

The necessity for water has led a number of people to come up with their own means and methods of accessing water. Without proper professional guidance, some people practicing self-supply have experimented with a number of technologies in their quest for solutions to either augment their water supply or establish water supply in uncovered areas. This paper seeks to explore the triumphs and challenges of self supply.

In order, to ward off the escalating costs of rent, a young family made a decision to move into their unfinished house on the outskirts of Kampala at a time when there was no electricity and water. The lack of water soon proved a major hurdle. Initially, they had young men ferry water for them from a privately owned protected spring about 2km away. They later bought a 2,000l plastic water tank and harvested rainwater from their roof, but this proved inadequate, especially during dry periods. Eventually they bought into a suggestion to dig a well. They did this and fitted it with an electric pump and today they have all the water they need. Building the well, was quite an expensive undertaking, with a total cost of about 4,500,000/-. The owners consider it a worthwhile investment. They installed a 1000l elevation tank; the original 2,000l tank was also connected to the groundwater source to ensure a reserve capacity of 3,500l which would give them some respite in case of power failure. The construction of the well was quite innovative, using a combination of bricks and concrete culverts to line the different depths of the well and leaving some sections unlined to minimize costs.

Although they spent a total of 6,000,000/- to complete their array of self supply solutions, this cost has been recouped within 2 years and there remains an unexplored potential to cash in on their investment by supplying water to new neighbours. Lingering, but not grave questions about the bacteriological quality of the water remain, which for now are being addressed by boiling drinking water.

Introduction

The provision of safe water is enshrined in the constitution of the Republic of Uganda (1997). The Ministry of Water and Environment (MWE) is responsible for initiating national policies and setting national standards and priorities for water and sanitation development and management with its Directorate of Water Development (DWD) seeing to the overall technical oversight for planning, implementation and supervision of the delivery of rural and urban water sources across the country. It also ensures water for production. It lends support to Local Governments, as well as capacity building to local governments, private operators and other service providers. The districts and sub counties are empowered by the local government act to provide water and sanitation services, for which they receive conditional grants from the central government. In addition, they may mobilize and generate more funds internally. The National Water and Sewerage Corporation (NWSC) is an autonomous body responsible for the supply of water to 19 large urban centres. It recoups its operational costs by billing its customers. Furthermore, a number of NGOs are active in providing water and sanitation services to complement the efforts of all the above.

Predominantly, point sources are used in rural areas with deep boreholes accounting for 38% of the population served, shallow wells (25%), and protected springs (26%). Piped systems are for urban areas and rural growth centres. These account for 24% and include public outlets and private and institutional connections. The national water coverage is 66%. In rural areas, the coverage is defined for a source within 1km, while the distance is 200m for urban areas. (Ministry of Water and Environment, 2010) The urban and rural populations also have differing service levels in terms of estimated per capita water demand.

Self supply refers to local or private initiatives by individuals, households or communities to improve their water supplies without relying on external help. It has been defined as the improvement to household water supply through user investment in water treatment, supply construction and upgrading, and rainwater harvesting. It is based on incremental improvements in steps which are easily replicable, with technologies affordable to the users (Sutton, 2009). People resort to this approach for a number of reasons. Some of them are: to lower utilities costs charged by operators, to augment other sources of supply where it may be inadequate, to improve accessibility of water supply, and to provide a means for water supply where it is inexistent and yet needed.

This paper discusses a successful case of the benefits of self-supply where a young businessman, Mr Geoffrey Muhairwe compelled by the lack of a water supply in his new residence was forced to individually develop his own water supply.

Description of the Case Study – Approach or Technology

Mr. Geoffrey Muhairwe, a young business man was compelled to resort to various methods of self supply when he and his young family moved to Kiteezi-Kabaga, in Wakiso district. At the time, the estate was largely undeveloped and the young couple felt compelled to occupy their unfinished house to free themselves from the rapidly rising costs. Whereas they considered on-site water and electricity important, the two were not readily available when they moved. The cost of connecting to the NWSC water pipelines would have been prohibitive as it would have required at least some kilometres of pipe.

The family first collected water from a protected spring about 2 km from their home. It was inconvenient, but the water was free and all they had to do was pay some youth to ferry the water. In time, they realised the potential for rainwater harvesting and bought a 2,000l plastic tank for the purpose. Later, they followed some advice and dug a well and fitted it with an electric pump and started to collect water from a tap in their yard. The next step in their quest for better water supply was to undertake indoor plumbing so that the water can be accessed from inside the house. Along the way, they integrated their ground water supply system with the storage tank originally meant for rainwater to increase reliability in case of power failure. The journey they embarked on is consistent with other self supply initiatives where users identify a problem and act within their means to solve it and incrementally apply modifications to it to suit their own requirements. Rainwater Harvesting is quite a significant method of self supply in Uganda accounting for 27% of drinking water during the wet season (Danert, 2010). In this case, a series of solutions evolved and rainwater harvesting is still maintained to an extent, but is not relied upon to meet the family's entire water needs.

Initial use of Available Protected Source

At first, due to the need to balance between the competing need to finish and furnish the house, Geoffrey and Judith paid 2 young men to fetch water for them from a spring about 2km from their home. Although the protected spring had been privately developed, there was no charge levied for water collected from the spring. During this time, the household of six used to use 10 jerry cans of water, collected at a cost of 200/- each or 6,000/- a day and 60,000/- per month. This served the family well enough in meeting their immediate water needs even though they had to be conservative with the water.

With time, the owner of the protected spring realised that the Muhairwes had the capacity to pay for the water they collected and started charging for the water. The initial charge was 100/- per 20 litre jerry can that was later increased to 200/-. For their average monthly consumption of 300 jerry cans of water, they required a total of 120,000 shillings per month, which they considered to be on the high side.

Rainwater Harvesting

Rainwater harvesting appeared to be the next logical step that would give them some reprieve from the high costs of water from the protected spring. They therefore invested in a 2,000l capacity plastic rainwater tank with the belief that they would store enough water at a time to last at least one month. They fitted gutters on both sides of the roof. The tank was installed just outside the front of the house and fitted with a tap. The installed cost of the rainwater harvesting system including gutters was 1,500,000 shillings. Water for various house requirements was then collected from the outside tank. The installed storage only provided enough water for one week. This wasn't nearly sufficient so the water collection from the protected spring resumed despite the new available source of water.

Hand dug well Solution

Since the rainwater harvesting and storage solution did not sufficiently solve their water problem, the Muhairwes were still in search of a lasting solution. It was during this time that Mr. Muhairwe met a friend who advised him to dig a well, as their property was bordering a wetland and so they were likely to easily strike groundwater. The Muhairwes embraced the idea with the belief that it would cost about 500,000/- to dig the well.

The selected site was just after the gateway leading into their compound and was at a higher elevation than their house. There is a slope from the gate down to the house and their house is at the lowest altitude in the entire estate, on the edge of a wetland. After digging for about 4 days to a depth of about 35 feet, they reached the ground water level. The lower reaches of the well were lined by seven 900mm culverts. They fitted an electric pump to the well at a cost of 1,200,000 shillings. Plumbing work was done connecting the well and pump to an outside tap stand. The electric pump required armoured cables which were difficult to find on the market, but they were eventually located.

An elevation stand holding a 1000l plastic tank was integrated into the design. The elevated tank fed into the original 2,000l rainwater tank. This was used as a reserve in case of power failure. The upper 1.5m of the well was lined by fired clay bricks and a concrete slab with a lockable manhole access cover. This was to protect children from falling into the ditch and to protect the expensive pump from thieves.

The final installed system integrates both rainwater harvesting and storage and groundwater abstraction. The cost of the well, pump and elevation tank came to 4,500,000/- excluding the original rainwater harvesting system.

Geoffrey and Judith have made additional improvements to their water system doing internal plumbing works inside the house so they can now access water inside the house. Though the water is aesthetically pleasing, lingering questions remain about the water quality, due to the 20 feet deep pit latrine within the same compound but also due to the increased development of residential houses at a higher elevation than the Muhairwe's compound. No water quality tests or analysis has been carried out so the family boils their drinking water as a treatment method.

Main results and lessons learnt

The family has come full circle in their quest for a reliable water supply system. Today they have adequate water for all their domestic needs. They are satisfied with the system they have in place and have not had any water shortages since its full implementation. They no longer pay for the water they consume but admit that in retrospect, it would have been impossible for them to carry out the steps that they did in any other way. They know that the system they have presently is superior to all the ones they used before but yet they could not have afforded this system earlier. Their approach and experience is consistent with the general self supply concept which encourages the incremental improvement of household and community supply through user investment in water treatment, supply construction and upgrading.

One result is that the family now has a reliable water supply in place that has so far not been prey to seasonal variations. They have consolidated this advantage by using the 2,000l tank as reserve storage. Owing to the now rampant power outages due to load shedding, they routinely pump water for about three minutes every morning and evening to ensue that in case of a long power outage they would not be negatively affected.

Secondly they are experiencing reduced water costs and a potential to recover part of their cost. National Water and sewerage Corporation charges 1,585 shillings per cubic metre compared to 20,000 shillings per cubic metre they would have been paying by collecting water from the protected spring 2km away. An immediate neighbour expressed interest in being supplied water by the Muhairwes, a service for which he was willing to pay. However, they feared to enter into an arrangement for which they knew no precedent, but they have a water system that could supply at least a few homes in their immediate neighbourhood. In the end their neighbour opted to build a rainwater tank, which could be the beginning of another interesting and costly self supply journey.

It was quite a costly venture. The total cost of installed self supply hardware in the home is 6,000,000 shillings compared to 105,000 to 210,000 shillings for ½" to ¾" pipe supply for up to 50 m from an NWSC service point. (www.nwsc.co.ug). However this option was not available to them. It is still not available, though it is likely to be available soon due to the population growth in the area and large number of houses. Furthermore, since they entered their house in March 2009, they would have spent 2,880,000/- buying water going by their consumption at the time which was 10 jerry cans of water a day at a cost of 400/- each. Today they wash their car every evening and have a flush toilet in the house. This could account for an additional 11 jerry cans of water per day. The cost over a 2 year period would then be 6,048,000/-. The return period on this investment is therefore about 2 years. However, over a period of 10 years, assuming no increase in cost at the well or transportation cost, they would spend 30,240,000/- on buying water. Compared to their total current investment, they would save 24,192,000/- over a 10 year period. Even allowing for the contribution of the water pump to their electricity bill, their self supply solution would still be a less costly option.

All in all, the series of solutions they adopted were appropriate and adequate for the challenges they faced. They could not have done it all at once because it was beyond their means to pay the cost for the whole system at one go. They did what was affordable and manageable at a time and now they have good water security. The remaining concerns are around the water quality which is unknown and fear for the security of the pump. A question for the future will be whether the water supply system will maintain the same appeal and significance when NWSC eventually covers the area and whether viable options will present themselves and be taken to share the cost of the installed system with new neighbours. However, at this point, their self supply system has already saved them some money.

Conclusions and Recommendations

Conclusions

It cannot be denied that self supply continues to be an approach used by many and not only those in areas which are not covered by utility companies. There are still people in areas that are covered by NWSC who opt to carry out self supply either to augment their own water supply or as a preferred alternative to piped water supply.

As the struggle to increase water coverage continues, this vital approach needs to be well developed. People who carry out self supply suffer in isolation for the best supply and technology to use. As a result they may incur high capital costs and expensive experiments sometimes ending in failure. Often they have to implement solutions with limited or no technical expertise. As there are a myriad of people seeking self-supply solutions, there are a myriad of solutions. The challenge is to be able to sift through these solutions for the optimal solution that will save money, time and other resources.

The other challenge is how to effectively extend a self supply line. The self supply hardware could potentially be expanded to serve at least five households in the neighbourhood. What mechanisms need to be in place to effectively engage the neighbours? Clearly, as each neighbour seeks their own solution, they'll have to pay a very high cost regardless of what technology they adopt.

Recommendations

As part of the recommendations, stakeholders in the water sector, such as the Ministry of Water and Environment, Local Governments and NGOs should take a keen interest in such self supply initiatives with a view to coming up with guidelines or manuals for various scenarios that demand self supply, detailing where people may get technical advice, various self supply technologies and associated costs.

There needs to be a bridging of the gap between people practicing self supply in a localized area by encouraging processes that would bring people together to come up with a joint solution. This would save everyone from very high household hardware costs for self supply. For instance another neighbour dug their own well while others have resorted to rainwater harvesting. The cumulative individual costs of all these isolated actions are quite high. Arguably, they are less costly than buying and ferrying water. However a joint solution would be cheaper but an agreeable mechanism and enabling environment needs to be in place. This would require technical assistance and the right set of policies to guide such actions.

The quality of the water remains suspect because it hasn't been tested. There are a number of laboratories in the country that can carry out specialized tests for microbial tests, chemical contamination and other standards for drinking water. The cost of these tests would be a huge additional cost for a household. One test for Ecoli in the NWSC-Central laboratory is 37,500/-. This would be a much smaller cost if distributed amongst say 10 households, making a case for cooperation in self-supply. An alternative would be to use the Portable Microbial Laboratory (PML) developed by Professor Bob Metcalf of California State University in Sacramento. The PML consists of 25 Colilert and Petrifilm tests that fit inside a gallon-size zip lock plastic bag and small plastic bags(Whirl Paks) to collect water samples, sterile plastic pipettes, and a battery – operated long wave UV light for the Colilert test. Incubation can be done using the human body. Test results are present after 12 to 18 hours of incubation and the test can easily be done by an adult at home. Ten tests cost $47, so it would be a less costly alternative.

Self supply, as demonstrated in this case can at times be a more financially sustainable option. It is frequently associated with high financial capital costs that scare many people away. Meanwhile, they unwittingly spend much more on buying water, which several times does not fully meet their water requirements of quantity and convenience. Funding mechanisms through banks and micro finance institutions that distribute the cost over several months could gainfully equip more people to carry out self supply.

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