WATER SUPPLY

Reclaimed water – A valuable supply if you can trust it

In the national conversation about water scarcity and the concerns around the drought in the Western Cape in particular, one often hears discussions about groundwater abstraction and seawater desalination to augment drinking water supplies. But there is another attainable, viable and affordable solution often missing from these discussions — direct reclamation of municipal wastewater for drinking purposes. A transdisciplinary research team advises, in a recent Water Research Commission (WRC) report, that we have to engage and educate the public to ensure informed acceptance before reclaimed water is rolled-out. Article by Kim Trollip.

South Africa is a water-scarce country. Any additional source of water should be used, and when it comes to alternative water sources, there are many, of which reclaimed water is one. But the water sector needs to ensure public support before this source is rolled-out across the country.

"The reclamation of water for drinking purposes has a vital role in augmenting supply in order to meet the ever growing demands for drinking water," says WRC drinking water treatment and quality specialist, Dr Nonhlanhla Kalebaila. "Treated wastewater effluent should be regarded as an alternative raw water resource for drinking water production, and it can free considerable amounts of source water for the environment and increase flows to vital ecosystems."

Several reports have emanated from a project entitled ***An investigation into the social, institutional and economic implications of reusing reclaimed wastewater for domestic application in South Africa*** (WRC Project No. K5/2208). Initially the research focused on establishing guidelines on the monitoring, management and communication of water quality (Volume 1). In a follow-up investigation, the work shifted focus to institutional and social factors influencing public acceptance of reclaimed water for potable uses in South Africa (Volume 2).

During this second phase of the project, the researchers found that public perceptions of risks associated with using reclaimed water are initially dominated by the "yuck" factor, because the idea is at first repugnant. But an additional, unexpected dimension to public resistance to reclaimed water for potable use emerged… and it had nothing to do with the so-called yuck factor. It had to do with public trust in municipalities and water service institutions.

The overall aim of phase two was to investigate and test the major factors that govern people's decisions towards the use of reclaimed water for drinking purposes; and to develop strategies and tools to inform better information-sharing and public engagement within the institutional decision-making process for introducing reclaimed water. The intention was to find ways to influence public perceptions through public knowledge acquisition and information flows, and to engage with the public in order to overcome resistance and build trust, so as to assist water institutions effectively to introduce and manage water reclamation schemes. The researchers found a significant lack of trust in the ability of municipalities and water service institutions to deliver safe water.

Public acceptance of reclaimed water in South Africa remains contentious because of social and institutional factors. Within each municipal context and at stages of the institutional process for introducing water reclamation, opportunities for public queries and institutional responses can serve simultaneously to enhance social learning and build trust in public institutions.

Christophe Muanda of the Cape Peninsula University of Technology (CPUT), lead author of Volume 2 of the research, says the potential of reclaimed water will only be realised if there is a strong associated public education campaign. "Decision-makers, mayors, premiers, community leaders and even teachers need to be briefed and can then participate in the campaign. Journalists too must play a role. We need to look at the language that is used when discussing the issue. Let's call it 'water reclamation'. I heard a journalist on the radio talk about 'municipal sewerage'. It is important to use the correct terminology i.e. recycled or reclaimed water, and ensure that there is mutual understanding on water reclamation technologies and as well the quality and fitness for use of the final water."

The report recommends that water institutions engage with identified target groups to shift public resistance toward acceptance and promotion. The report proposes an approach that will address public resistance to improve acceptance of water reclamation. It is hoped that its findings will aid municipalities in their quest to improve service delivery through productive engagement with the public.

Water reclamation measures up well to other water supply options

There is a comprehensive scenario planning and options analysis process that is normally conducted during water resources planning. This entails identifying multiple "what if" conditions that consider a range of possible factors, including social, environmental (physical), technical, economic, and/or institutional, in order to identify the best water supply option over time, i.e. short, medium and long term. Compared to reclaimed water, groundwater and desalinated water are fairly established drinking water sources, not just in the Western Cape, but in South Africa, and can be implemented fairly quickly. Water reclamation from treated domestic wastewater effluent represents a shift from the largely accepted drinking water supply strategies and requires significant investments in time for feasibility studies, including public engagement and participation.

Groundup/Ashraf Hendricks

Dwindling surface sources have shifted the focus to alternative supplies.

Co-author of Volume 2, Prof Alvin Lagardien of CPUT, adds that as a water scarce country, vulnerable to climate change impacts and increasing urban water demand, it is inevitable that water reclamation for potable applications will became an essential component of supply-side arrangements. He says, "It is in this context that public understanding of water scarcity risks and reclamation as an option paves the way for getting over the 'yuck' factor. In situations where available water supply becomes constrained and water restrictions are implemented, the 'yuck' factor becomes increasingly less significant to South Africans."

The Beaufort West success story

Cities and larger towns produce treated effluent that holds huge potential for further use. **Beaufort West** bears the distinction of having launched South Africa's first direct potable reuse (DPR) plant, where treated wastewater effluent is conveyed directly to a **water** treatment facility for further treatment to drinking **water** standard.

Muanda, who calls himself a social civil engineer has over the past decade moved from hard core engineering to incorporate aspects of social science in his work. He worked closely with experienced social scientist, Dr Jacky Goldin, of the University of the Western Cape on the social aspects of this particular project.

The Beaufort West project had its challenges initially when residents expressed concern. It was ultimately ongoing two-way communication with the local residents that resulted in a successful roll-out. The WRC's Dr Kalebaila adds that, "Water reclamation projects, just like any other project, require active stakeholder and community participation, and not just as part of fulfilling regulatory requirements. It is something that should be done from the beginning. Public participation and engagement is necessary during water resources planning, and ensures mutual understanding of the choice of water sources available.

"In addition to the above, there is a need to streamline the institutional process for the implementation of water reclamation projects in order to improve their adoption and lessen both real and perceived risks to public health."

A framework for examining the readiness of water institutions to implement water reclamation

Based on the findings, public acceptance of reclaimed water in South Africa remains contentious because of social and institutional factors. Within each municipal context and at stages

of the institutional process for introducing water reclamation, opportunities for public queries and institutional responses can serve simultaneously to enhance social learning and build trust in public institutions. Volume 2 concludes that water institutions should engage with identified target groups to shift public resistance toward acceptance and promotion. The research proposes an approach that will address public resistance to improve acceptance of water reclamation. It is hoped that the findings will aid municipalities in their quest to improve service delivery through productive engagement with the public.

International and local studies essentially agree that negative public perceptions of reclaimed water relate to factors hinging on public knowledge and trust in the institutions responsible for producing the water. This qualitative study of the social and institutional implications of reclaimed water for potable applications has also developed guidelines to enable institutions to address public perceptions so as to ensure the successful implementation of reused water schemes.

The guidelines, Volume 3, provide a framework to address negative public perceptions in this regard.

There is a knowledge deficit in the public domain about water scarcity and the specific strategies to reconcile supply and demand at a local level. From a supply-side perspective, as part of local reconciliation strategies, there are is a hierarchy of options to augment supplies based on local conditions and technical and economic considerations. It is this context that the value proposition of reclamation should be highlighted and proposed as viable and desirable.

The guideline evolved around the several stages in the institutional process for the implementation of reclaimed water schemes and emphasised two elements, knowledge and public engagement.

Guidelines for public engagement on water reuse

Planning: the public is informed about water scarcity with tangible evidence and predictor signs through public awareness campaigns and meetings. Then the purpose, outcomes and impacts of the reconciliation and feasibility studies must be explained through public meetings, discussion forums, information centres and media, both before and after the studies have been conducted.

Reuse decision: the municipality's selection of reclaimed water technology should be conveyed, with endorsement of its benefits, the efficacy of the treatment and its cost-effectiveness. Reference should be made to examples of successful implementation, with leaders/celebrities assisting at public gatherings. Information should also be disseminated through discussion forums, school visits, the media and water bills.

Implementation: public knowledge of safety measures, the capabilities of the plant operating staff and management in respect of operating and maintaining the plant, should be shared through public meetings, site visits, information centres, school and general awareness programmes.

Post-implementation: information about the safety of treated water, monitoring programmes, water quality (water quality parameters, frequency of tests and results), safety measures and risk management plan should make use of guided plant visits, information campaigns and road shows.

The broader research team and the WRC agree that more work needs to be done beyond the guidelines. For example, there remains an absence of documentation providing guidance or a framework for examining the capabilities and readiness of water institutions to implement water reclamation. It is therefore recommended that further research be undertaken to understand and evaluate water services institutions' readiness and capability to introduce water reclamation and implement a strategic approach to overcome public concerns. The objective is to develop a set of criteria that could be used to predict the capacity and readiness of water institutions to undertake the implementation of water reuse.

The article is based on findings from a project entitled: ***An investigation into the social, institutional and economic implications of reusing reclaimed wastewater for domestic application in South Africa*** (**WRC Project No. K5/2208**). The project has produced a series of three reports thus far:

- Volume 1: ***Guidance on Monitoring, Management and Communication of Water Quality*** (**WRC Report No. TT 641/15**)
- Volume 2: I***nvestigation into institutional and social factors influencing public acceptance of reclaimed water for potable uses in South Africa*** (**WRC Report No. TT 734/17**)
- Volume 3: ***Framework guidelines for public engagement on water reuse*** (**WRC Report No. TT735/17**)

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