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UCT study explores using seawater instead of drinking water to flush toilets

A [study](#) by the University of Cape Town (UCT) titled "Feasibility of using seawater to flush toilets in the African context" explores using seawater to flush toilets in Cape Town.

The study commissioned by [South Africa's Water Research Commission](#) has been published in [The Conversation](#).

UCT Water Engineering lecturer and co-author of the study Teboho Mofokeng researches water management and reuse in South Africa. She said the study found that Capetonians were willing to pay up to 10% more on their water bills to use seawater to flush their toilets, as long as it doesn't smell or stain them.

Mofokeng said one problem was that 20-30% of the city's drinkable water supply to households was used to flush toilets.

Another problem was that in some Cape Town communities, as well as the coastal cities of Durban and Gqeberha, wastewater is discharged into the sea with little treatment to remove harmful germs.

"The third problem is that as demand for housing grows, so does the need for water and sanitation. When more and more wastewater is discharged into the sea, it is a lost opportunity to keep the water within the urban water management system, and use it again," Mofokeng noted.

However, when new housing developments are connected to the water supply network, alternatives to flushing toilets with drinking water can be considered. One option is seawater.

Another alternative could be recycled water. "Toilet water could be treated to remove harmful bacteria and reused for flushing. This would need a closed water system for flushing toilets. It would eliminate the current loss of drinking water flushed down toilets and then discharged into the sea," she said.

The researchers asked 239 people if they'd be willing to flush with seawater or recycled water or continue to flush with drinking water but pay more to do so. They also asked how they felt about toilet wastewater being discharged into the sea.

"Our survey had mixed findings. Overall, 90% of people were willing to move away from using drinking water for toilet flushing, but only if the new water source did not stain the toilet bowl, was clear and had no smell.

"We found that 58% of the people we surveyed preferred using seawater to recycled water for toilet flushing. However, there were differences in preference according to income, gender and household size. About 45% of the people we interviewed earned more than R12 800 per month. They preferred to use drinking water to flush toilets. But females with a higher education qualification were more likely to pay extra for both seawater and recycled water options. Homes where more than three people lived were more likely to pay for recycled water than seawater," Mofokeng said.

On average, 10-15% of Capetonians' municipal bills went towards paying for water. The study looked at the preferences of households that pay R350 to R900 per month for water and found they were willing to pay 5-10% more to use clean and clear alternative water.

Treating wastewater before discharging it into the sea would cost money. The study found that people were not willing to foot this bill. They were in favour of the city treating wastewater only if it reduced their water bill by up to 7%.

Seawater flushing has its drawbacks though. It would need a duplicate network to be set up, with one network of water pipes for the drinking water supply and another for the toilet flushing water supply. This would mean that both new and ageing water systems would be set up or replaced by systems with a duplicate pipe network.

Mofokeng said: "Usually water supply networks use concrete, steel or plastic pipes. But because seawater corrodes, plastic pipes will be needed for the seawater flushing pipe network. Plastic manufacturing and the raw materials needed have a significant impact on the environment. On the other hand, steel or concrete pipes would need to be replaced more frequently than plastic pipes."

Storage facilities, such as reservoirs, will also need to be built and a new system set up to treat seawater before it is piped to homes.

She said the chemicals and electricity required to clean the water, supply water to consumers, and eventually dispose of the wastewater would add to the costs. Since South Africa's energy is still electricity made by burning coal, using up more energy in a duplicate water system would increase global warming significantly. So, a renewable energy system would need to be set up.

Mofokeng said despite these drawbacks, a duplicate system has worked well in Hong Kong. Using less freshwater also benefits the environment more. She said it was crucial that coastal cities like Cape Town, whose populations are growing, invest in water supplies from unconventional sources.

"People have to become more aware that not all household activities need to use drinking water. Increasing public awareness and education about the benefits of using alternative water can help people to accept that they won't be able to flush their toilets with clean, drinkable water for much longer," she warned.

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