

# Water supply: Look beyond technology and innovation

Today's water summit may also discuss why water utilities globally are losing consumers' trust and confidence and how to reverse this trend. **BY ASIT K BISWAS, CECILIA TORTAJADA AND HO KANG LENG**

**N**EARLY 300 utility managers from major cities of the world are meeting in Singapore today for a summit on technology and innovation under the aegis of the Singapore International Water Week. The focus of the summit is to identify "drivers of innovation and technology focus areas".

There is no question that Singapore is an excellent choice for such a meeting. Over the past two decades, it has made major advances in treating wastewater so that its quality can be even better than tap water. This has radically advanced Singapore's quest for water security – even now, the republic imports nearly 50 per cent of its water from Johor in Malaysia. For the city-state, water is not only a strategic issue but also an existential one.

The main architect of modern Singapore, Lee Kuan Yew, realised the strategic importance of water for the country's survival and development more than 50 years ago. He was the only prime minister in the world for whom water was a priority issue for all the decades he was in power. In contrast, political leaders in every country are interested in water only when there is a major flood, prolonged drought or natural disaster. When the event is over, their interest in water promptly evaporates until the next catastrophe.

Unfortunately, water problems cannot be solved by short-term crisis management policies: They need long-term consistent high-level political commitments. This is a major reason why Singapore has leapfrogged nearly all other countries in urban water management.

Looking at the global development scene, we believe that during the next decade or so, technological innovations and technical improvements are most likely to be incremental in this area. Any transformational advances are unlikely to occur and be usable during the next decade.

We are convinced that more significant improvements for the next decade will not come from technological innovations or new engineering solutions. Rather, they will come from better understanding of how humans view and interact with water and their mutual interrelationships by use of efficient economic instruments and properly formulated social policies. Thus, during the next decade significant advances are likely to come from economists and sociologists rather than hardcore technologists.

Unfortunately, the urban water profession has been dominated historically by engineers and they have not realised the need for social scientists to play increasingly important roles in urban water management.

Let us take the most startling and unexpected trend in urban water management that we have just identified. Throughout the world, both in developed and developing countries, consumers are progressively losing trust and confidence in the water utilities that provide them with water and wastewater management services.

Consider developing countries. Historically, water utilities have never provided satisfactory water supply and wastewater management services. Accordingly, consumers never had much trust on their abilities to supply water that could be considered safe to drink straight from the taps without any health concerns. In much of the developing world, each household has been forced to become a mini-utility to convert an intermittent delivery (typically a couple of hours in mornings and evenings) to a 24-hour continuous supply and then use their own point-of-use treatment systems to make the supply safe to drink.

Each household would be forced to construct an underground tank to store water. Whenever water is supplied for a few hours, this storage tank is filled up. Households also had to construct roof-top tanks, pipe networks to connect the two tanks and pumps to supply water to roof-top tanks. This system allowed them to have a 24-hour water supply in their houses for which they are responsible.

Householders then made agreements with private-sector companies to install point-of-use treatment systems and maintain them regularly. Thus, municipalities have provided only bulk water and it has been up to the householders to convert it to a regular supply of drinkable water.

## Americans' drinking habits

Change in the period 2001-2011

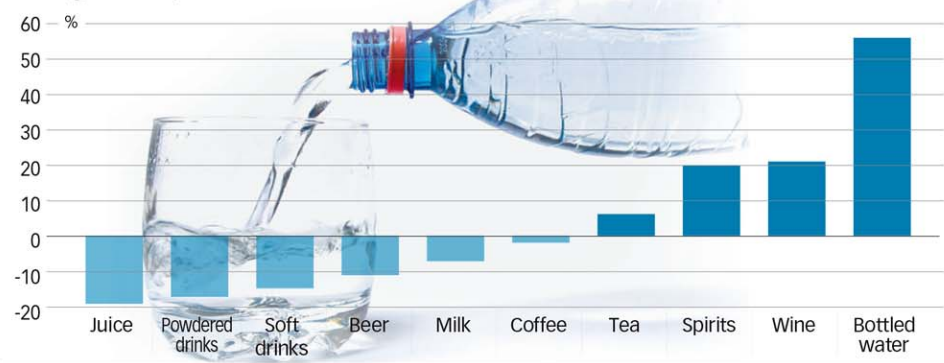


Photo: Freeimages Source: Third World Centre for Water Management, Mexico

The situation, however, has changed in recent years. The number of middle-class households has increased exponentially and they are better educated and more health-conscious compared to the earlier generations. Thus, quality of water has become an important lifestyle issue for this new generation. They feel that earlier simple treatment systems such as carbon filters are no longer adequate and have shifted in a massive scale to more complex, expensive and sophisticated systems that employ the principles of reverse osmosis. They have progressively lost faith and confidence in their water utilities.

The trust and confidence in urban utilities in the West have also progressively declined, irrespective of whether they are managed publicly or privately. The quality of water they provide may be perfectly safe to drink, but a rapidly increasing number of people no longer directly drink from the tap.

Over the past decade, water prices in most Western cities have increased at a rate slightly higher than inflation. The latest trend is that household spending on bottled water and sophisticated point-of-use treatment systems are increasing 2.5 to 3.5 times faster than their water rates. Consequently, a very significant percentage of households are now spending more money on bottled water and point-of-use treatment systems than on water rates. If this trend continues for the next five years, most households will be spending more on such external water-use systems than their utility bills.

## DIFFERENT FINDINGS

Take Singapore. Its water-supply system is the envy of the world. Yet, our surveys of some Housing & Development Board residents and online polls of Singaporean residents and permanent residents, as well as random interviews, show a paradox. Some 80 per cent of the people we polled drink only boiled water, even though water supplied by the PUB is perfectly safe to drink by all national and international standards.

When we asked why they felt water has to be boiled, the most common answer was "boiling water has been a family tradition". A few said they knew the water was safe, but they boiled it "just in case it was not". Some believe the water was not safe to drink. When we asked them for the reason(s), we received some hesitant and ambiguous responses.

Another online survey, this time of only foreigners now living in Singapore, showed a very different situation: 80 per cent said they drank water straight from the tap. Around 10 per cent said they boiled water. Interestingly, this latter group came from China and the Philippines, where the quality of water supplied by the utilities leaves much to be desired. Another 10 per cent said they drank only bottled water. In other words, non-Singaporeans from Europe and North America trust the tap water here more than Singaporeans.

In addition, an increasing number of households is using point-of-use treatment systems. The system vendors are making many claims that would be difficult to prove scientifically. In addition to claiming that these systems take out all pollutants, some claim they make water

alkaline, or treat water with special enzymes, which produces water of better quality, and thus is good for health.

Singapore currently imports about 50 per cent of its water from Johor. In contrast, all its energy sources are imported. Thus, heating water not only unnecessarily wastes energy but also increases household energy bills. We estimate that households are spending 20-30 per cent of their water bills on boiling water unnecessarily.

Singapore has made remarkable progress in technological fixes to reduce water consumption, such as low-flush toilets or water-efficient washing machines. What is needed now is an intensive education and public awareness programme that would significantly change age-old behavioural and perceptual problems in terms of water quality. For this to happen, increasingly more social scientists would have to be involved in water management. Another issue is that the water price has remained the same since 2000. As a result, by 2014, because of inflation, the water price has declined in real terms by 25.48 per cent. This is in contrast to electricity and gas bills. The latter have risen at slightly higher rates than inflation.

In addition, in 2000 the median employed resident household income was S\$4,398. It rose to S\$8,292 by 2014. Thus, if we assume that median households used 20 cubic metres of water each month, their water bill represented 0.69 per cent of income in 2000. In 2014, it declined to just 0.36 per cent.

The households we interviewed said if the price of water goes up, they would pay for it. However, some complained strongly of the high cost of electricity. Singapore's current daily per capita water use is 150 litres. Current targets are to reduce it to 147 litres by 2020 and to 140 litres by 2030. These are not ambitious enough for a water-deficient country. Significant reduction in water use in many European cities has been possible through water pricing and changing the perceptions and value systems of their citizens through a variety of actions. An example is Hamburg. Daily per capita water use, in 2008, was 105 litres. This is something Singaporean policymakers may wish to consider.

We strongly support and endorse technological innovations for the future. However, during the next 10 years, countries such as Singapore will get better value for money by giving more emphasis to economic and social instruments for water management which need accelerated attention.

In addition to discussing innovation, the participants at today's water summit may spend some time to discuss why water utilities around the world are losing the trust and confidence of their consumers and what can be done to reverse this trend. Efficient water management is not only about engineering and technology, there are strong linkages to economic and behavioural sciences as well. Sadly, all over the world, the latter aspects have been mostly neglected during the last several decades.

Asit K Biswas is distinguished visiting professor and Cecilia Tortajada senior research fellow at Lee Kuan Yew School of Public Policy. Ho Kang Leng is a student at the National University of Singapore