**SINGAPORE’S INPUT TO THE**

**SPECIAL RAPPORTEUR ON HUMAN RIGHTS TO**

**SAFE DRINKING WATER AND SANITATION’S**

**CALL FOR CONTRIBUTIONS**

**Water and Sanitation**

* 1. As a small city-state with limited natural resources and high population density, Singapore is among the most water-stressed countries in the world. Despite our constraints, we have come a long way and have achieved access to affordable and high quality water as well as modern and accessible sanitation for all in Singapore. Singapore’s tap water is well within the World Health Organisation (WHO) drinking water guidelines, and all of Singapore’s population has access to clean drinking water from the tap regardless of social strata and gender. This is in line with Sustainable Development Goal 6 of ensuring availability and sustainable management of water and sanitation for all.

**Robust and Diversified Water Supply**

2. We do not take this for granted. To add to our perennial water stress situation, erratic weather patterns due to climate change threaten our conventional water sources. Singapore has thus developed a robust and diversified water supply known as the “Four National Taps” (comprising local catchment water, imported water, high-grade reclaimed water known as NEWater, and desalinated water). In particular, we have invested in weather-resilient water sources (i.e. NEWater and desalinated water) to diversify and strengthen our water supply. NEWater, in particular, was a major milestone for Singapore to close the water loop. Produced by further purifying treated used water using advanced membrane technologies, it is ultra-clean and safe to drink. While NEWater is currently used mainly for non-domestic purposes, it is also used to top up Singapore’s reservoirs during dry months. NEWater embodies the circular economy, allowing us to endlessly recycle water, reusing it again and again. Prior to its launch in 2003, Singapore’s National Water Agency - PUB - embarked on a comprehensive public education campaign, garnering public confidence and acceptance for NEWater. In recognition of these efforts, NEWater won the 'Water for Life' United Nations Water (UN-Water) Best Practices Award 2014.

3. While NEWater and desalinated water relieve our water stress situation, they are more energy intensive than conventional water treatment. As such, we are harnessing R&D with the aim to reduce the energy consumption of NEWater and desalination. To reduce the carbon footprint of our operations, PUB is adopting renewable energy through innovative methods like deploying floating solar farms. Today, there is already a good pipeline of projects lined up by PUB to deploy more floating solar systems on reservoirs, for instance, two 1.5 megawatt-peak (MWp) systems on Bedok and Lower Seletar Reservoirs as well as a 60 MWp project at Tengeh Reservoir. Expected to be operational by 2021, the floating PV solar system on Tengeh Reservoir will be one of the world’s largest when completed.

**100% Modern Sanitation**

4. 100% of Singapore’s population is served by a modern sanitation system. This allows all used water to be collected and treated, and prevents pollution of waterways, canals and reservoirs. To support Singapore’s long-term water needs, PUB has constructed a deep tunnel sewerage system (DTSS), which conveys used water entirely by gravity to centralised water reclamation plants for treatment and recycling into NEWater. The DTSS enhances the reliability of used water system and minimises the risk of contamination between water catchments and used water system. Furthermore, it eliminates the need for pumping stations, frees up land for other developments and allows for large-scale efficient used water treatment.

5. Singapore has expanded the circular economy approach and the upcoming Tuas Nexus, to be completed in 2027, will be the world’s first greenfield development to integrate a water reclamation plant and incineration plant. Tuas Nexus will co-digest used water sludge and food waste into biogas which in turn, will power the plant.

6. Although Singapore has made much progress for sanitation, it recognises that the lack of access to improved sanitation continues to affect the welfare of 2.5 billion people across the world and there is thus a need for greater attention to be paid to the global sanitation challenge. Hence, Singapore tabled the “Sanitation For All” resolution at the 67th UN General Assembly in 2013 to designate 19 November as World Toilet Day. The resolution was adopted by consensus and co-sponsored by 122 countries.

**Managing Water Demand**

7. While Singapore has a robust and sustainable water supply through its Four National Taps, it also adopts a three-pronged strategy to manage water demand and achieve a sustainable level of water consumption:

* Pricing water to reflect its scarcity. The water price in Singapore is pegged to the long run marginal cost (i.e. the cost of supplying the next drop of water), and is charged based on the quantum of water used. The Government also provides rebates to help public housing households defray utilities expenses. This helps to ensure that water remains affordable, especially for the lower-income households.
* Mandatory water efficiency measures such as water efficiency labelling for water fittings and appliances, minimum water efficiency standards and requiring businesses/industries which are large water users to appoint water efficiency managers and to submit water efficiency management plans annually.
* Public engagement through extensive public education and outreach programs to encourage the population to use water wisely. These include water conservation campaigns, water efficiency courses and guidelines for businesses to improve their water efficiency.

8. Through these measures, Singapore's per capita household water consumption has been successfully brought down from 149 litres per day in 2016 to the current 141 litres per day. We are working towards lowering this further, to 130 litres per day by 2030.

**Flood Management**

9. Singapore receives an average of 2.4m of rainfall each year. To manage this storm water in the highly-urbanised nation, PUB adopts a “source-pathway-receptor” approach. First, new and re-developments are required to implement “source” measures such as detention tanks to limit the peak runoff that is discharged into the public drains. Second, PUB continually implements a comprehensive drainage improvement programme to increase the conveyance capacity of drains and canals that form the “pathway”. Third, new and re-developments are required to adopt “receptor” flood protection measures, such as higher platform and crest levels, to protect them from any residual flood risk. As a result of these efforts, Singapore has reduced its flood-prone area from some 3,400ha in the 1970s to less than 30ha today. In addition, Singapore actively studies the potential impacts of climate change, such as more intensive rainfall and rising sea level, and plans adaptation measures to protect the nation against those impacts.

**Transforming Singapore’s Waterways**

10. The Active, Beautiful, Clean Waters (ABC Waters) Programme is a long-term initiative by PUB, to transform Singapore’s waterways and reservoirs beyond their utilitarian functions into beautiful streams, rivers and lakes that are well-integrated with the surrounding parks and spaces. Launched in 2006, this initiative cultivates public ownership over our waterways and water bodies, and fosters an appreciation of our precious water resources. By harnessing the full potential of Singapore’s waterbodies, the ABC Waters Programme enhances Singaporeans’ quality of living, and also plays a part in transforming Singapore into a City of Gardens and Water.

**Sharing Singapore’s Experience**

11. The Singapore Water Academy (SgWA) is a practitioner-focused institute in urban water management. The Academy leverages PUB’s experience in serving Singapore’s water needs to provide a suite of programmes that enhances water management competencies for water professionals. The flagship Singapore Water Management (SgWM) Series is an international training programme that comprises four courses, namely: water quality, sustainable urban stormwater management, water reuse and water supply network management. These topics are pertinent to the water challenges faced by many cities around the world, and the programme has thus far been well-received globally. In addition, PUB also collaborates with partners such as UNICEF to address the Water, Sanitation and Hygiene (WASH) agenda. Since 2017, SgWA, UNICEF and the Singapore Ministry of Foreign Affairs have organised a course titled “Leaving No One Behind: Sustainable WASH Services in a Rapidly Changing Context”.

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