



### Tariq Siddiqui

Chief Strategist, TS Advisory Services

#### About the author:

He is the Chief Strategist of TS Advisory Services which works on the philosophy to evolve, adapt, and innovate as success means choosing to change for the better. He is responsible for evaluating, defining and developing measurable marketing and communication strategies for water companies. A doctorate in media, he has over 26-years of experience working with different sectors including water and wastewater.

## WATER: THE DNA OF LIFE

Ever thought about how water is being used or we say misused by us for decades. In ancient India, water was treated as sacred as it is purified as well as the purifier, the real and spiritually conceived source of life. The Harappan civilization (~3000–1500 BC) epitomizes the level of development of water sciences in ancient India that includes construction of sophisticated hydraulic structures, water supply system, wastewater disposal systems based on centralized and decentralized concepts, and methods for wastewater treatment. The Mauryan Empire (322–185 BC) is credited as the first “hydraulic civilization” and is characterized by the construction of dams with spillways, reservoirs, and channels; they also had an understanding of water balance, development of water pricing systems, measurement of rainfall, and knowledge of the various hydrological processes.

In the first century B.C., Sringerapuram near

Allahabad had sophisticated water harvesting system channelling the flood water of the river Ganga. During the reign of Chandragupta Maurya, dams, lakes and irrigation systems were extensively built. The kings and queens were aware of the importance of water for their populace and always giving importance to it. Bhopal Lake was built in the 11th century, was one of the largest artificial lakes of its time. In the 14th century, the tank in Hauz Khas, Delhi was constructed to provide water to Siri Fort area. Some of the ancient hydraulic structures for water storage and supply could still be found in some places.

In contrast to our ancestors, modern day water use practices are mostly unsustainable without concerning the challenges of scarcity and pollution. There is high demand of clean water from people, industries and agriculture and all of them consuming trillions of litres of clean water every day while discharging an equal amount of wastewater.

[www.tsas.org.in](http://www.tsas.org.in) [www.linkedin.com/in/tariq-siddiqui-a9288915/](https://www.linkedin.com/in/tariq-siddiqui-a9288915/)

### The Conundrum

Most of the fresh water consumption in the country is for the irrigation; it is above 80% of total water use of the country. If we consider the water use efficiency of irrigation projects, it is very low and only about 30–40% making India the world's largest user of groundwater. It is absolutely important to introduce new methods and technologies for agriculture

4,000 billion cubic meters of rains. The country captures only 6 per cent of its annual rainfall, which is amongst the lowest in the world. According to the Central Water Commission, water levels in 91 major Indian reservoirs are at 25% of its total capacity which is 2% less than the average storage in a decade. Urban centres in China has worked extensively on rain water harvesting projects and in Beijing only, it has

Irrigation consumes more than 80% of total water in India with water use efficiency as low as 30%. Improving irrigation water use will help ease the pressure on water stress.



Clean Water Matters

production such as drip irrigation, rainwater harvesting, cloud based micro irrigation, and sprinkler etc. along with technology support to increase water use efficiency as much as possible. With water resources decreasing fast, it has become crucial to educate farmers to use water wisely and implement sustainable methods in farming.

India needs a maximum of 3,000 billion cubic meters (BCM) of water a year while it receives

increased rapidly to reach 57.20%. The total water storage capacity of India is 181.6 million acre foot (maf) spread across 5202 dams and reservoirs. Compare this with China's 672.72 maf in 98,000 dams and reservoirs.

It is predicted that India will have to face severe water deficit of around 50% by 2030 according to Asian Development Bank report. It has already started afflicting large number of population. Niti Aayog has reported in

By awarding water projects to the lowest bidder, innovative technology solutions that could be beneficial and sustainable is getting compromised at the early stage of project implementation.



**Drinking water: A precious resource**

2019 that around 600 million people in the country are facing severe to extreme water scarcity. If that is not enough challenge to counter, Central Ground Water Board has reported that over 900 million people are having arsenic affects in India by drinking contaminated water. The availability of water is also a grave concern and it is predicted that 21 major cities across India, including Delhi, Bengaluru, and Chennai are on the verge of running out of groundwater.



**Wastewater disposed into river**

The country which generates more than 73,000 MLD of municipal sewage per day in urban settlements, is expected to increase the load to over 87,000–97,000 MLD by 2025. But around 70% of wastewater directly goes back into water bodies without any treatment. The situation is little better with industrial wastewater where about 60% – 70% is receiving some kind of treatment before disposal.

The water infrastructure is huge and mostly buried underground. India is facing a huge challenge of dilapidated state of its legacy water infrastructure, losing almost 50% of treated water to leaking pipes as NRW and water utilities tend to ignore the issue until disaster strikes. Then there is another challenge while planning and tendering for new infrastructure development; the contracts are awarded mainly based on (lowest) costs, giving little consideration to environmental, technological or societal impacts, supply chain nature and location, or life cycle analysis, sustainability and resiliency of the solutions proposed. This results into innovative technology solutions getting shelved from the list at the early planning stage, resulting in status quo project delivery on old and rundown system. The format impels water utilities and municipalities missing out on the incredible new technologies which not only provide long-term and sustainable benefits in addressing the current and emerging challenges but also proves to be more cost-effective in the end.

What we need to do is re-evaluate the way the water infrastructure development projects are awarded and money spent. It requires an out-of-box thinking and problem solving conditions and getting more for the investment made because the water utilities does not have the funding capacity to meet all infrastructure renewal and rehabilitation needs if we continue to use the traditional approach of granting the project and building it.

**The Solution**

In 2015, the United Nations announced clean water and sanitation accessibility to all people in the world as the sixth Sustainable Development Goal (SDG). After eight years, we are constantly reminded of its importance and slow progress towards achieving the goal by member nations. And it has got more significance with the pandemic created big havoc globally and highlighted the importance of washing hands and maintaining cleanliness.

Smart solutions powered by modern day technological intervention like artificial intelligence (AI), internet of thing (IoT), machine learning (ML), automation etc. helps in smart water management by not only analysing the data for probability of failure in aging infrastructure, but doing a host of intelligent operation and maintenance task thereby identifying areas that need improvement and repair. The intelligence demonstrated by vast water infrastructure through these technologies support the efforts of water utilities in improving life and efficiency of the asset through timely intervention. AI also offers the potential to enhance service delivery, optimize investments, and reduce costs. Automation and robotics help to fine tune work processes for greater efficiency. Robotic lab analysers can test two to three times more samples than human operators and

allow analysis to be carried out round the clock. This helps to keep a strict check on various parameters concerning quality of water.

Big data and analytics techniques help in harnessing the data coming from different sources and provide early indications in areas like quality, abnormal consumption, reliable fault detection, and optimized customer interactions. The processed data can also be used to address particular challenges in the water industry including detection of leaks, costs of energy-intensive pumping stations, reducing risk and resources while other areas such as health and safety, energy efficiency and even CO2 emissions can also be predicted. Adopting smart water infrastructure like smart metering, smart leak detection techniques would help in reducing non-revenue water with real-time monitoring to ensure a sizeable reduction in transmission and distribution losses thus resulting in better management of revenue and resources.

Electronic instruments like pressure and acoustic sensors, telemetry units and control systems connected wirelessly with cloud-based monitoring system generate real time information on leaks with accurate location details so that they can be detected in the distribution network quickly and precisely. Drones on the other hand can be used for efficient execution and monitoring. Smart end-to-end water networks offer the opportunity to improve productivity and efficiency while enhancing customer service.

### Way Ahead

Water management is a significantly challenging task. It requires totally integrated approach with the goal being to maximize performance, efficiency, lifespan and safety through remote monitoring, pre-emptive maintenance and reducing losses. For a country which is facing acute water scarcity and higher contamination challenges, need to rapidly adopt sustainable way of water management practices while implementing systematic approach towards wastewater treatment with complete reuse facilities. Best practices in irrigation and industries may expeditiously be implemented with innovative technology and adequate financial resources.

Exceptional circumstances may be prompted with unique out-of-the-box problem-solving mindset and ensuring that innovative solutions



Water\_The DNA of Life

**Smart water management technology and intelligent solutions must be implemented to ensure we have water, the DNA of life, to survive and thrive.**

make it to the table and are seen and heard and given the right amount of attention during the bidding process for any water infrastructure development project. Project development and management methods known for decades must be re-evaluated to see if it fits the modern day requirement with long term perspective and evaluate the innovative solutions available that could solve the current and emerging challenges rapidly and economically.