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Subhash Sethi is the Chairman of leading water company – SPML Infra Limited. He has been instrumental in developing India's water sector with EPC and BOOT projects to help water utilities deliver safe and clean drinking water to millions of people in India. For his valuable contribution in water and infrastructure sector, he has been conferred with several prestigious awards including Economic Times Global Asian Business Leader.

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THE ENIGMA OF WATER

Water is the source of all activities, an essential element in the production of everything we consume; from food, clothes, durables, gadgets, cars and all we can think and use. From a cup of morning coffee that takes an estimated 140 litres of water to produce to a pair of leather shoes that requires 8,000 litres; water is at the basis of everything. The changing world scenario, increasing population, growing commercial activities and improving living standards has necessitated the intervention of technology for water sustainability. Using digital solutions, water cycle sustainability can be reinvented to improve resource conservation, increase efficiency, encourage decarbonisation and maintain consumer engagement.

Water Stress

The world is facing an unprecedented crisis of drinking water. Ever rising populations, growing economies, increasing consumption patterns cumulated with growing water pollution have intensified the demand for water at a time when 40 percent of the world's population lives in water-scarce regions. The World Bank has estimated that more than 2 billion people live in highly water stressed countries, and about 4 billion people experience severe water scarcity. Water stress will continue to intensify as demand for water grows. It is calculated that global consumption of water has increased by about 600 percent in the last one hundred years and it continues to grow at a faster rate now. A UNESCO and UN-Water study has suggested that global demand for water will increase by 20 to 30 percent by 2050 and more than half the world's population will be at risk of water stress by then.

The group of scientist working on emerging water scenario has predicted that the gap between global water supply and demand would widen to 40 percent by 2030 and intense water scarcity could displace as many as 700 million people by then. Equitable access to safe water is vital for healthy and prosperous societies and it supports balancing of ecosystems and biodiversity. It is also crucial in producing food and energy and used in most industrial processes. The lack of water results in food scarcity; hinders industrial development and slower economic growth. Some



19 MLD Water Treatment Plant, Gagreen, Rajasthan

regions including India could see the decline in growth rates by as much as 6 percent of GDP by 2050 because of water-related losses in agriculture, industry, health and income etc.

India Water Scenario

India is facing an alarming water scarcity. A sizeable part of India's large population is facing problems of clean drinking water facilities. The ever increasing demand of fresh water is faced with limited resource augmentation. The combined factor of limited water supply along with declining quality is dominant issues.

Almost 18 percent of world's population lives in India which has very limited quantity of global water. With just a fraction of world's fresh water sources, India is grappling with a historical water crisis with over 600 million people facing severe water scarcity and country's largest cities are marching towards 'day zero' situation in near future.

The declining water sources are not the only challenge faced by the country; imagine the crisis burgeoning that out of the very limited availability, almost 80 percent of our surface water has become polluted. Nearly 60 percent of India's ground water reserves are contaminated with biological, organic, and inorganic pollutants. Across India, the groundwater that provides an invaluable buffer between monsoons is severely depleted and in danger of being irreversibly lost. This is perceived as an indication to the larger problem that would affect efficient water management in a country aspiring to be an economic super power and the most populous on the planet in a few years' time.

The Central Pollution Control Board (CPCB) has found that 18 major rivers in India are unfit for any domestic and industrial water use. The Niti Aayog has flagged the issue saying that the water situation in the country is reasonably stressful and around 100 million people will be affected by the shortage of groundwater in 21 Indian cities including the mega cities of Delhi, Bengaluru, Chennai and Hyderabad. They also highlighted that more than 600 million people in India is facing severe to extreme water scarcity and the number will keep on increasing unless strong measures for replenishing of water sources is not taken instantaneously.

India, by extracting more groundwater way beyond the permissible limit has already reached a point where water supply disruptions may pose a difficult political and economic challenge. With over 230 billion cubic metre groundwater drawn out each year for irrigating agriculture lands in India, many parts of the country are experiencing rapid depletion of groundwater. The total estimated groundwater depletion in India is in the range of 122–199 billion cubic metre. The UNESCO World Water Development report states that India is the largest extractor of groundwater in the world.

As much as half of the world's total water supply is being stolen.

300 ml Raw Water Reservoir at Pokhran, Rajasthan



About 85 percent of rural drinking water needs, 65 percent of irrigation needs, 50 percent of urban drinking water and industrial needs are fulfilled from the ground water sources. With a vast geographical area in the country, water woes are prevalent in terms of supply as well as distribution, which is a much bigger challenge. A huge part of the total population are living mostly in rural areas and on the periphery of cities and towns and are not connected to the piped water supply which forced them to mine groundwater to survive. With the expansion of urban habitats and business hubs across cities and towns in India, these emerging growth centres are putting tremendous pressure on both surface and ground water sources. Extensive unmonitored and unregulated groundwater extraction has caused India's water table to plunge to depths of unimaginable level.

Solution with Technological Intervention

New innovations in technology are helping water utilities to deal with declining resources and transforming water distribution system for better management.

Water is essential for socioeconomic development and is a contributing factor in nearly every Sustainable Development Goal.

The sophisticated and digitally connected pipeline networks, treatment plants with modern filtration system, supervisory and management control of supply system, innovative leak detection and other digital intervention in water sector is helping to deal with the present challenges.

The Sustainable Development Goal 6 (SDG 6) of the United Nations focuses on ensuring a clean and stable water supply and effective sanitation for all by year 2030. Presently, more than 40 percent of the world's population is suffering due to lack of clean drinking water facilities and many people throughout the world lack these basic services even in the economically developing regions.

Most countries are working towards the implementation of policies and reforms to achieve the SDG6 target. There is a combination of factors including financial resources, human capacity, technology and governance arrangements that are conducive to implementing the 2030 agenda and making progress towards the target. With the changing world scenario where technology is playing an important role in everybody's life with digital and connected devices, latest innovation and creative technologies needs to be implemented in water sector with the aim to increase access to safe water for everyone.

In the water utility market, reducing water loss, ensuring water quality and optimising both hydraulic and treatment infrastructure are essential to sustain efficient resource usage and to secure reliable services. Resource optimisation extends beyond water to energy as well. In addition to energy efficiency gains, effective utilisation of renewable energy sources and implementation of microgrids at treatment plants increases plant autonomy



and further contributes to utility decarbonisation. These goals – all essential to creating a resilient future – can only be fully achieved through utilising modern technology. Digital solutions are able to help make the quality, quantity and impact of water visible. There are plenty of smart water solutions that prove how IoT and digital technology can improve the processes in the water industry. To improve sustainability, data-led transformation is needed. Investing in digital technology should be part of the strategy for water utilities for making cost-effective and resilient resource conservation, improve long term efficiency, reduce the impact of the water sector on the planet and create a better and greener future.

Curbing Water Loss

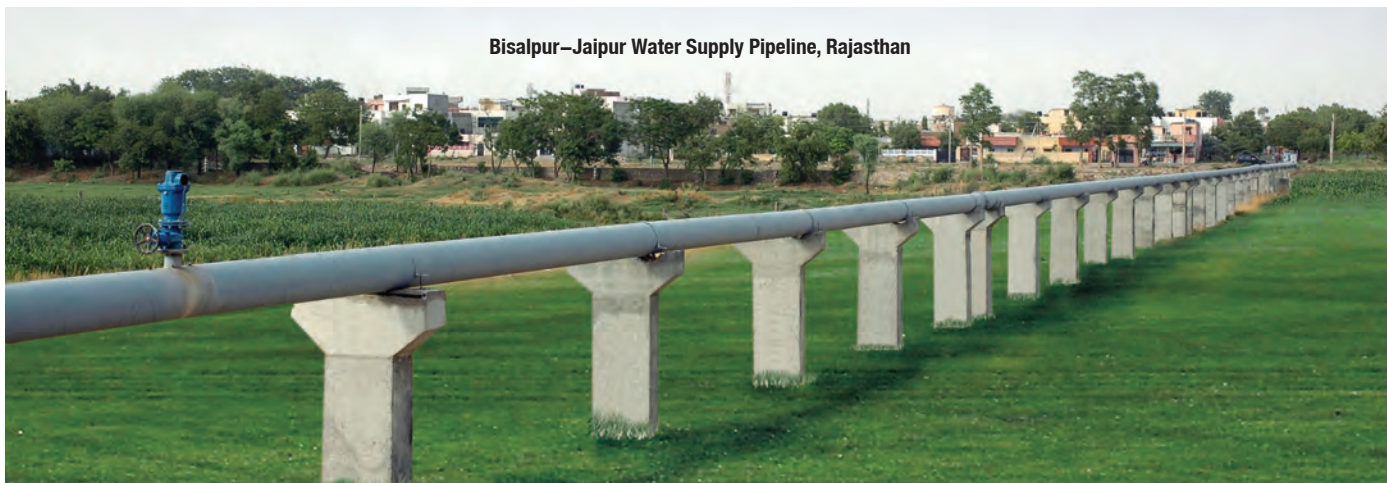
Low operating efficiency, higher rate of non-revenue water and low energy efficiency linked to aging infrastructure together with inefficient practices, limited investments, and low tariffs make it difficult for water utilities to

recover costs and improve service sustainability. Water loss is among one of the top issues faced by water utilities globally. It is estimated that 3.4 trillion liters of treated drinking water leaks each year from the aged and outdated supply networks in India. The average household leaks can account for nearly 45,500 liters of water wasted every year and 10 percent of homes have leaks that waste 1,46,000 liters or more in a year. The World Bank has calculated that the cost of non-revenue water due to frequent leaks along with standard theft and billing errors exceeds USD 14 billion globally.

Huge amount of treated water is lost in distribution networks. In developing countries alone, it is estimated that 45 million cubic meters of precious water is lost every day in distribution networks. Water leakages are not only costly for utilities but at the same time it highly increases the chance of water pollution while mounting pressure on already stretched and aging networks. India is among the countries with high level of water loss ratio, needs the technologically prompted smart monitoring system to control on such wastage with quality monitoring in the supply network. Electronic instruments, such as pressure and acoustic sensors, telemetry units and software connected wirelessly in real time basis to the centralized and cloud-based monitoring systems creates insights for the decision-makers and allow utilities to detect and pinpoint leaks quickly and precisely. Data-driven technologies such as



The inability to recognize the value of water is the main cause of its waste and misuse.



Bisalpur–Jaipur Water Supply Pipeline, Rajasthan

continuous monitoring and adaptive control can enable the optimization of water resources vis a vis supply and distribution network.

As demand for water increases and many areas worldwide face escalating periods of drought, providing a continuous supply of clean water poses a serious challenge for water utilities. Utilizing digital technologies to reduce water loss and create a more resilient supply network is fast becoming a priority investment area.

The water utilities in India are struggling to contain water losses from the distribution system. It is particularly disheartening that water loss at half of the total water supply, India is placed at the bottom of the world's top 40 water markets as reported by Global Water Intelligence. The aging and deteriorating water infrastructure and huge costs associated with repair and replacement are among the top concerns for water utilities. Water loss is a critical issue for India as it is facing historic water stress in several large cities across the country. The severe water scarcity is further aggravated with the changing climate patterns and increasing population with faster urbanization trends as cities across the country exploding in size and number.

The water distribution loss in India varies between cities depending on the location and age of the water supply system. Some cities are losing up to 70 percent of supplied water due to broken pipelines, tampered meters or prevailing water theft etc. Pipe leaks and breaks that allow water to escape are dangerous as it becomes the source of contamination harming the quality of the water. Water pollution in the country is a serious issue as estimated about half a million children die every year due to water borne diseases. Water distribution network is hidden below the surface where it can't be easily seen or measured. The water engineers working in the field finds it difficult to pinpoint the real place or cause of leaks and breakdowns and what percentage of water is being wasted. Repair efforts are usually done to the most obvious places of water loss, like significant water main breaks or clearly visible leaks on the surface.

SPML Infra Limited is executing a water loss management project in 43 selected DMAs in Bengaluru. It has implied innovative leak detection technology to accurately identify and locate all hidden leaks in large and

small pipes and replacing or repairing them with sustainable methods. Executing such a project in central part of the city was very challenging due to high traffic volume, main business districts combined with narrow streets and thickly populated areas.

The project that is nearing completion has covered major areas where 50–60 years' old pipes are replaced with new pipes, leakage has been repaired holistically and GSM/GPRS enabled district meters were installed for communicating water flow measurement and pressure control for taking preventive and informed decisions. The dedicated efforts bring good results in significantly reducing water loss level from 53 percent to 21 percent thus saving around 48.34 million litres' of potable water per day. The saved water is being used to provide drinking water facilities to more than 110 residential colonies and slum clusters of Bengaluru.

Way Forward

The climate crisis, increasing demand for water, shortage of manpower, environmental impact; these are just some of the basic challenges faced by water utilities which are only going to become more severe with time. As utilities look to the future, investing in digital technologies to help manage these challenges no longer remains a choice, but has instead become a necessity. Digital solutions offer new ways to optimize, manage, and conserve water. The water sector globally is embracing digital solutions so it can better respond to customer demands and growing pressures.

Remote sensing, smart meters, big data, advanced simulation tools, and artificial intelligence enable utilities to manage and optimize a diversified water–supply portfolio. Digital solutions also help extend and improve the quality of water resources, expand infrastructure life cycles, optimize operations and maintenance, increase energy efficiency, reduce NRW, and help prepare for a changing environment or potential crisis. Apart from digitization of network, lowering consumption practices also reduces the amount of wastewater to be treated. By investing in water conservation measures, utilities can increase water availability without having to build more infrastructures, saving the costs of water supply and treatment and wastewater treatment and disposal, thus increasing the chance of sustainability.