



Express Water

INDIA'S PREMIER WATER COMMUNITY PLATFORM

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Cutting Our Losses -NRW

Water Loss Management - Necessity of Time

Water has become a serious economic, social and political issue with increased importance. Every day, this new oil of future is on the headlines amongst the biggest stories of our era. We need to think deeply about the challenges and work towards enduring solutions.

By Subhash Sethi



Subhash Sethi, Chairman, SPML Infra Limited

IN INDIA, ALMOST one-third of the population lives in cities and this is set to grow to half of the population in the decades to come. With economic growth, the urbanization is happening rapidly and resulting in major pressure on water supplies, wastewater collection and

treatment, water quality and public health.

With increasing population and rising consumption level, India is sooner than later going to be confronted with a serious resource challenge. The available resource has reduced over the years but the demand esca-

lated and it is projected to very soon overtake the availability of water. The water demand will continue to grow and by the year 2025, it is expected to increase by over 20 percent, fueled by the industrial requirements which are projected to double from 23.2 trillion liters at present to 47 trillion liters. Domestic demand is expected to grow by around 40 percent from 41 to 55 trillion liters while irrigation will require 14 percent more to 592 trillion liters up from 517 trillion liters currently. The water ministry predicts that per capita water availability will reduce by 36 percent in 2025 and by about 60 percent in 2050 from the level of 2001. While agriculture will remain to be the major water user in India, the challenges posed by growing urbanization on water requirement calls for a monumental shift in response from all stakeholders.

Non-Revenue Water

One of the major issues affecting water utilities in India is the considerable loss of water from the amount of water put into the distribution system and the actual water billed to consumers. A phenomenon called as non-revenue water (NRW), a well-known issue that results in large volumes of water being lost through leaks in the supply system and not being invoiced to customers. It is a very real challenge faced by the majority

of water utilities as a consequence of increased urbanization, higher demand, increased prices and ageing and dilapidated distribution networks. In India, the non-revenue water level is quite high which results in huge volumes of treated water being lost during transmission and distribution that affects the financial capability of water utilities through lost revenues and increased operational costs. A high level of NRW indicates that our water utilities are poorly managed with governance issues, lacks in accountability and technical and managerial skills necessary to provide reliable service to their citizens.

In western countries, urbanization took place when their economic conditions were improving steadily, and over a significantly longer period. The cities were planned with adequate funds and expertise to develop required infrastructure to manage their water and wastewater properly. In contrast, the magnitude of India's increasing population and levels of urbanization simply overwhelmed the financial and management capacities of the cities, including their water supply and wastewater management systems. The problems have been further aggravated because the policymakers have been interested in water-related issues only when droughts and floods occur. Once these

natural disasters were over, the interest in water basically evaporated and plans made during the challenging times put to rest.

Water Loss Management

The water utilities in India are struggling to provide clean drinking water due to ever-increasing populations, expanding service areas and high level of water loss. Reducing water losses is critical to efficient resource utilization, efficient utility management, enhanced consumer satisfaction, and reduction in capital-intensive capacity addition. The costs of water service are much lower when undertaken through investments in reducing water losses rather than through investments in capital projects to augment supply capacities. The utility, which has initiated and sustained water loss management programs, has significantly gained in terms of financial returns and better consumer services.

An example is Bangalore water loss management project



Damaged Supply Line in Bengaluru



Mechanical Joint in Supply Pipeline in Bengaluru NRW Project

which was initiated by the Bangalore Water Supply and Sewerage Board. This JICA funded project was awarded to SPML Infra in consortium with Suez. By using innovative technology of helium leak detection to accurately identify and locate hidden leaks in large and small pipes, the NRW reduced significantly from 61 percent at the beginning of the project to 33 percent thus saving 16.5 MLD of drinking water. In a busy city like Bangalore, executing water loss management project in central part was an engineering challenge due to very high traffic volume combined with narrow streets of thickly populated areas and business hubs. The works also executed in areas with the maximum number of slums posing as a tough challenge to bring down the water loss from the existing levels to the present levels. The project has already covered major areas where 50-60-year-old pipes are replaced with new pipes, leakage has been sealed and electronic district meters suitable for GSM/GPRS communication for measuring flow and pressure control are installed. The project is under execution and we envisage that water loss level will be further reduced to get a standard city level by the time project is completed. From the 16.5 million liters of water saved by this water loss management project, the government of Karnataka has implemented a scheme to provide 10,000 liters free water each month to every household with the regularized connection to the economically poor, SC and ST families.

The need for water loss management is so important to the operational and financial

feasibility of our water utilities but it is hard to understand why efforts to improve the situation have been so limited. Cities like Singapore, Manila and Phnom Penh have successfully implemented water loss management programs to reduce NRW to below 20 percent levels. In India a few successful examples of utilities (e.g. BWSSB) and some places where serious actions for water loss management have at least started. For all water utilities in India, reducing NRW should be the top priority to follow when addressing the increased demand for piped water supply. Expanding water networks without addressing water losses will only lead to a cycle of waste and inefficiency. The high rate of NRW is also related to poor energy efficiency since water transported in the distribution system is loaded with energy through the distribution and treatment processes. Thus, energy is lost along with the water. Therefore, reducing NRW is important to overall efficiency and financial sustainability of the utilities, since it provides additional revenue



Split Collar to Repair Barrel Crack in Bengaluru NRW Project

and reduces costs. Although it is not feasible for water utilities to eliminate the NRW completely, even reducing it by half the current level of losses in cities appears a realistic target. If we can achieve this much reduction, the utilities can save a good amount of money every year from both increased revenues and reduced costs and can service additional population without any new investments in production facilities nor drawing further on scarce water resources.

In more and more states in India, the unthinkable is hap-

pening. Water scarcity has become real, the long dry spell that has sent farm production plummeting, depleted and dried ground wells, dams, reservoirs, and several rivers are drying and trickling into the sand. The water distribution is also not even across the country. Gujarat and Rajasthan are among the most water-deprived states with respect to rainfall and per capita water availability. They face acute water scarcity challenges as rainfall patterns are impacted by climate change. Increasing agricultural and industrial demand is placing additional pressure on dwindling water resources. Over the years, the unrestricted exploitation of groundwater across the country has led to aquifers no longer being able to naturally replenish themselves. In the absence of surface water resources in major parts of the country, drinking water is drawn either from underground sources or physically transported over long distances. For such areas, water is not free and maybe even more precious than oil due to huge challenges in getting it.

SPML Infra has contributed immensely in developing robust and sustainable water infrastructure in Gujarat, Karnataka, Rajasthan and other states over the last three decades which has helped in providing clean drinking water facilities to millions of people across the country. The number of projects executed by SPML Infra has also helped the water utilities in saving on cost in terms of water loss management and better supply services and connecting new areas with piped water supply.

Some of the key drinking water projects executed by SPML Infra in the country are:

- Phase 2 of Saurashtra-Narmada Avtaran Irrigation (SAUNI) Yojana that envisages to irrigate 1.8 million hectares of land in Saurashtra, Kutch, and north Gujarat; benefiting millions of farmers and supplying potable water to 39 million people across 132 towns and

11,456 villages in Gujarat to address the scarcity of drinking water.

- SPML Infra is executing urban water supply projects for improvement in water distribution network in Delhi for Mehrauli & Vasant Vihar and adjoining areas covering around 50,000 house service connections, non-revenue water management, installation of AMR & Non AMR water meters, 24x7 consumer care centre, metering, and billing including operations & maintenance for 10 years.
- SPML Infra is also executing 6 important ADB funded 24X7 urban water supply projects in Karnataka in the cities: Bellary, Raichur, Haveri, Hospet, Gadag-Betageri, and Sindhanur to serve a combined population of about 1.3 million. The work involves rehabilitation and development of water distribution network; over 2500 km of water supply pipelines, rehabilitation, and replacement of 2,50,000 house service connections with installation of advanced water meters, non-revenue water management, 24x7 consumer care center, metering, billing including operations & maintenance in all cities for 5 years.
- SPML Infra has earlier completed Cauvery Water Supply Scheme for Bengaluru City with 500 MLD modern pumping station that has helped the water utility to provide drinking water facilities to over two million residents of new Bengaluru areas.
- Pokhran Water Supply Project is executed to provide a sustainable source of clean drinking water to over 12 lac populations residing in 580 villages of Jaisalmer and Barmer districts and nearby towns of Pokaran, Falsoond, Balotra and Siwana and along with bulk water demands of industries and defence forces.
- SPML Infra has executed the water supply project in the drought-prone south-east

region of Rajasthan to cater to the complete water requirement of Sawai Madhopur and Karauli.

- The 108 kilometers water pipeline linkage project in Pali, Rajasthan has resolved the water crisis of Pali city, benefiting 531 villages and 10 towns having over 8 lac populations.
- Bissalpur-Jaipur water supply project with additional 200 MLD water treatment plant at Surajpura is constructed to augment water supply services to Jaipur city and other areas to reduce the city's dependence on existing groundwater sources.
- Ramganjmandi Pachpahar water supply project is designed to provide drinking water facilities to 220 villages of and 4 towns catering to water needs of lacs of people of the area.
- The Gagreen water supply project is designed to provide drinking water facilities to more than 6 lac populations residing in 315 villages and 36 dhanies of Jhalawar district.
- Chambal-Sawaimadhopur-Nadauti water supply project is being executed to provide drinking water facilities to 926 villages and 3 towns of Gangapur, Karauli, and Sawaimadhopur for the benefit of several lac residents of the area.
- Integrated water supply project for Laxmangarh-Fatehpur & Ratangarh-Sujangarh is designed for the extension of existing water infrastructure to augment the drinking water supply to Ratangarh-Sujangarh & Fatehpur-Laxmangarh towns in Churu district. This project envisaged to provide drinking water to 6 towns & 431 villages of Churu district and 13 villages of Jhunjhunu district. These districts are well known for ground brackish water which was the only source of water for them which has also affected the health of a large number of residents.
- Bharatpur water supply project envisages to develop a

regional water supply infrastructure for the 246 villages (and their NRVs and dhanies of Kaman and Pahari tehsils and 63 villages), and other habitant of Nadouti tehsil (and 46 en-route villages of Gangapur and Karouli towns) in Rajasthan.

Water being a common resource is not properly regulated and hence subject to several market and system failures, both from the supply and user sides. With a target to provide access to sustainable water supply to the people, the water utilities can consider the following very important aspects to mitigate their water losses and manage the vital resources in a much better way.

Equitable Water Distribution

The World Bank report found that up to 80 percent of subsidies in the country went to medium and large farmers whereas the most affected by falling water tables are the rural poor and marginal farmers who lack the means to deepen their wells and install more powerful pumps. Make regulation to delinking water rights from land rights and treat groundwater a common resource so that the overexploitation can be controlled. At the same time, start the process of recharging aquifers through both natural processes and human efforts.

Demand Management and Tariff Reform

With ever-growing demand and widening gap in supply can only be controlled with an appropriate pricing of water backed by legislation and institutional support. The tariff reform must be combined with water delivery mechanism that consistently works and eliminates inefficiencies such as transmission losses and theft of water. For agriculture, the ideal policy is to promote water-saving crop and adoption of new irrigation technologies. The tariff structure that truly works for domestic, agricultural, and industrial users needs to be considered

Delivery Efficiency with Technology

Water delivery mechanism should be accurate as a fully functional consumer metering system can limit drinking water wastage and enforce conservation. Bulk metering for all water sources should go with consumer metering for domestic, industrial, and agricultural use. In the absence of a well-planned and rigorous framework, despite government's good intentions by way of policy documents, annual plans, and heavy central and state subsidies, adoption of relevant technologies by consumers and farmers are inadequate. The stringent legislation can help streamline equipment supply by discouraging production of inefficient conventional devices.

Groundwater Management

In many states of India, the groundwater withdrawal has surpassed recharge capabilities. In a state like Rajasthan with 90 percent dependence on groundwater, the water situation will soon become distressed. In many parts of the state physical transportation of water is the only solution to meet drinking water needs, an unsustainable practice. Every effort to help recharge underground aquifers across the country needs to be made, including micro watershed planning and restoration of traditional water bodies.

Water Harvesting

Rainfall during the monsoon is very limited in several parts of the country. Groundwater is not an option due to depletion or high total dissolved solids (TDS). With surface water also not available, rainwater harvesting is the most viable solution to meet drinking water needs. Rainwater harvesting must be a part of the micro-watershed planning and undertaken in all rural and urban settings to meet the demand for drinking, domestic, agriculture, and industrial water.

Improving Affordability

Improving affordability of

service would require cost optimization together with cost recovery strategies. This can be done through transparent, well-targeted subsidies for the poor, both to help obtain proper connections to service and to encourage the consumption of a minimum quantity of water.

Capacity Building

Capacity building in urban water supply and sanitation sector is an important step. A professional association of service providers could play a key role in disseminating best practices, implementing full scale benchmarking, and providing training and certification for sector professionals. Training institutions would need to adapt their programs, currently focused mainly on technical design issues, to the new needs of the urban sector. Special information programs would need to be developed for key stakeholders including local politicians, consumers, decision makers, engineers and the non-government organizations with a special interest in water supply and sanitation. In the rural sector, special training programs would also need to be developed to build the capacity of local municipalities and panchayats.

Way Forward

Water is paramount to a city's sustainability, but too often it is being wasted, polluted and taken for granted. Utilities which carefully and creatively use their water assets for strategic urban advantage will ultimately be more sustainable and competitive. To succeed in an increasingly complex water situation, the utilities need to focus on an alternative way for a more efficient water management and the opportunities new technology is offering in maintaining municipal water systems.

A strategic and pragmatic approach, based on real-time data and business processes analysis has to be implemented in order to address properly some of the key challenges if they are to thrive and remain



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competitive over the coming decades.

The good news is there are inspirational efforts currently in place in many of our cities to improve the provision of water. We need to prioritize greater investment and move faster from the strategizing and goal setting into actions that improve the availability of water with quality.

About the Author

Subhash Sethi is Chairman of SPML Infra Limited, a listed infrastructure development company in India. In the past over

three decades, he worked relentlessly with his mission to create enduring value and wealth for the country and the organization. Under his leadership, SPML Infra went on to establish itself as a leading Engineering and Infrastructure Development organization in India with over 600 completed projects in the domains of Water, Power, Sanitation, Environment, and Civil Infrastructure. The sustainable infrastructure created by SPML Infra helps water utilities to deliver safe and clean drinking water to about 40 million people of India.