

Water Infrastructure - Need of the Time

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By Subhash Sethi



200 MLD Water Treatment Plant, Surajpura, Rajasthan

THE FUTURE OF water in India is turbulent and our water infrastructure development and management is mostly non-sustainable for a longer period. We need to think differently and swiftly how to manage water, dramatic changes are required to develop robust water infrastructure and maintain them professionally.

With economic development, rapid urbanization and population growth, India's water demand is increasing significantly. The demand-supply gap is getting wider and water conflict is becoming a common phenomenon. The affliction point is the insufficient availability of clean water for distribution and scarcity that is spreading very fast. The water pollution, in general, and the degradation of groundwater quality, in particular, are the added

dimensions of water scarcity.

With the world's second largest population at 1.37 billion currently and expected to become the most populous by 2024 and continue growing to 1.7 billion by 2050, India finds it difficult to serve the vast majority of that populace with safe, clean water.

Supporting 16% of the world's population is a daunting task considering that India possesses only 4% of the world's fresh water. Imagine the crisis that out of the very limited water availability, almost 80% of our surface water is contaminated. Nearly 60% of India's groundwater reserves are already contaminated with biological, organic, and inorganic pollutants. The Central Pollution Control Board (CPCB) has found that 18 major rivers in India are unfit for any domestic and industrial water usage.

Water Infrastructure

If current trends continue, India is set to become a water scarce country in not too distant future. The scarcity is looming large on Indian cities and water utilities are facing their biggest challenge from aging infrastructure across the country. One of the most critical aspects of the aging infrastructure is literally buried underground, out of sight and, usually, out of mind. When failures occur, then only we are reminded of how much we take for granted our access to safe drinking water. The water supply to household and businesses in cities depends on a network of aging underground pipes, many of which are reaching, or have exceeded, the end of their useful life. The pumping machineries are dilapidated and the number of water main breaks frequently.

In the past century, people have steadily moved from rural to urban areas to improve their standard of living as well as the quality of life. In 1901, only 11% of India's population was urban. A century later, over 34% of people are living in urban settlements which are expected to grow further to reach 60% in urban areas by the year we reach 2050. A rapidly increasing urban population and the expanding middle class have driven up water demand, while years of pollution, inefficient farming, decentralized governance, groundwater exploitation and poor infrastructure have depleted the water supply.

There are several challenges being faced by water utilities in India, but the ageing infrastructure is at the root of them all. In particular, urbanization and population growth contribute to water scarcity and intensify the strain caused by ageing infrastructure. Among other key challenges is the problem of water loss or non-revenue water. Global non-revenue water estimates range from 30 to 40% of water produced, whereas it is as high as 50 to 60% in several cities in India. Water utilities in India are faced with the need to address all of these challenges and revamping of infrastructure on priority for social, economic and environmental implications. For decades, we have invested heavily in fossil fuels - coal, oil, gas, and their derivative chemicals and plastic with little or no concern for consequences that today are evident in the form of pollu-

tion in water-we cannot drink, air-we cannot breathe, toxic environment around us and our failure to manage by-products and waste. In earlier days, we responded through a number of regulations, laws, and international treaties for water and made some progress in limiting and mitigating the consequences. Those restrictions, even the alternative strategies to replenish and recycle the resources are weakening and we are again returning to old values, policies, and behaviors which were considered obsolete and not relevant. Water utilities in India are now tasked with the job of attempting to conserve a previously unregulated natural resource as it quickly becomes a politicized source of contention for different groups within society.

This is an issue that needs urgent attention from policy makers, relevant government officials, private partners and people at large, especially in cities where urbanization has become a more serious problem. While urbanization is a very important consideration which all developing countries need to manage efficiently, a significant number of cities in India is witnessing rapid population growth and utilities are finding they have constructed much lesser infrastructure than they needed. We need to develop water and wastewater infrastructure sustainability policy that has to promote sustainable infrastructure in the water sector. The policy's objective should be to ensure that all investments, policies, and actions



500 MLD Water Pumping Station, Bangalore

support water infrastructure in the most efficient and sustainable manner to help water utilities, enhance economic competitiveness and promote affordable operation & maintenance.

SPML Infra has been promoting access to clean drinking water to all with sustainable water infrastructure development for more than three decades and has executed over 600 projects in water and wastewater segments along with other key development. Being a leading player in the Indian water sector, it continuously features amongst the world's top 50 private water companies. With a number of water infrastructure development and key executed projects, it is providing drinking water facilities to over 40 million people across several states in India.

Water Storage

India has a highly variable climate and vastly seasonal pattern of rainfall. Estimated 50% of rainfall happens in just 15 days and 90% of river flows during three to four months of monsoon period only. Investments in large-scale water infrastructure development in India have been very few and by all international comparisons, the country

remains extremely short with such infrastructure.

India's water harvesting and storage capacity from the rainfall is extremely limited compared to other arid countries such as the United States and Australia where they have built over 5,000 cubic meters of water storage per capita; China can store about 1,000 cubic meters per capita, India's dams can store only 200 cubic meters per person. Moreover, India can store only about 30 days of rainfall, compared to 90 days in major river basins in developed countries. Water, especially in the water-rich north-east part of the country can be transformed from a curse to a blessing only if major investments are made in developing sustainable water infrastructure that will also deal with constant floods and draught situation. We need to recognize water as a stimulus for growth by combining major water infrastructure with a modern management approach. India needs to grow the capacity of its water storage from the existing about 200 billion cubic meters and it is more critical because of global climate change is going to have major impact in India, there is likely to be rapid glacial melting in coming decades in the western

Himalayas and increased variability of rainfall in large parts of the country.

The large investments required in water infrastructure will help in augmenting the economic and social development of India. The assured supplies of water meant that crop yields on irrigated land were consistently much higher than yields from rain-fed agriculture, allowing India to achieve national food security and associated affordability of food. Hydropower from many of the large dams will provide the reinforcements for Indian industrial growth and groundwater irrigation. It is not just huge water storage infrastructure that is needed everywhere; in many parts of the country there are also substantial returns from investments in smaller-scale, community-level water storage infrastructure such as tanks, check dams, ground reservoirs, water harvesting and local water recharge systems. And there are massive needs for investment in water supply systems for growing cities and for underserved semi-urban and rural populations. India's cities and industries also need to use water more effectively, and there will have to be massive investments in sewer networks and wastewater treatment plants.

This need arises because much of India's existing water infrastructure is crumbling and so there is an enormous backlog of deferred maintenance. The end result is the familiar sight of crumbling, rusting, leaking pipes, dams, canals, and other vital water infrastructure.

Financing Water Infrastructure

The financing of water infrastructure is getting difficult for the government whereas the need for investment is becoming more critical and urgent. Although there is some investment being done by the government with new schemes and grants made available under AMRUT, Clean Ganga Mission, Water Supply and

Irrigation Funds, Smart City Mission etc. The international funding for water infrastructure development has also

greater allocations of budgetary resources, more efficient use of those resources, and greater contributions from



It is very clear that India's water infrastructure needs a complete overhaul and there is not much time left to do that.

increased from development agencies such as ADB, World Bank and JICA in the past few years. However, the overall investment required in the sector is estimated to be INR 620,000 crore (USD 129 billion). India currently spends about 6 percent of its GDP on infrastructure, less than several countries in Asia, and nearly half of the 11 percent invested by China. Both central and states' governments are finding themselves increasingly constrained to fund large infra development projects for augmenting water supply and wastewater management. The financial needs of the water sector are growing exponentially with major gaps to meet the costs of rehabilitating the existing infrastructure and to build new facilities.

The budgetary allocations to the water sector are not sufficient as per the current requirement of infrastructure development and there is a large and growing financial gap, which can only be met by

water users.

We could consider a combination of methods to promote sustainable water infrastructure:

- **Efficiency in Management:** The utilities could emphasize on cutting costs and investing in water systems using a risk-based approach with adopting the best practices and bring much-needed efficiency. The utilities must adopt water efficiency at all levels from assets - pipeline, treatment, pumping, supply line, metering and set efficiency levels for manufacturers and others to promote water efficiency in operations and services.
- **Optimum Pricing:** Water in India is mainly subsidized and water utilities may consider charging the consumers for the full cost of construction, and operation & maintenance of water systems that are essential for sustainability.
- **Watershed Approach:** The importance of infrastruc-



3000 MM Dia MS Sauni Pipeline, Gujarat



Kalisindh Concrete Gravity Dam, Rajasthan

ture development and growth decisions within the context of how water flows through a watershed must be taken universally barring boundaries of cities and states. Watershed boundaries may not conform to state or municipal boundaries, so partnerships among center, state, and local authorities are essential for development and financing of pan India water infrastructure.

- **Water Governance:** Improving governance in the water sector is important since water availability is fragmented in the country. Water is a state subject; water supplies, irrigation & canals, drainage & embankments, and the storage falls

with the matter.

- **Alternate Financing of Water Infrastructure:** This has become significant due to several factors including limited public money and increasing construction and maintenance costs that are encouraging governments to explore alternative investment models. For India, some financing alternatives could be:
- **Public-Private Partnership (PPP):** Public-private partnerships have been tried earlier in India with water infrastructure projects, but with limited success as people think of water as their right and as a government obligation to provide them. The need is

ects in water supply, SPML Infra had mixed experience with PPP projects for cities water distribution.

- **Public Bonds:** Bonds are useful for financing large water infrastructure projects that will generate services and income for many years, as the money can be repaid over time. The advantage to municipal and public utility bonds are typically tax-advantaged, which allows the borrowing entity to pay lower rates to investors.
- **Local Taxes:** The funding of water infrastructure can be done by levying some kind of local taxes from consumers rather than completely relying upon the government funding. The tax amount and period can vary depending on the requirements of specific municipalities with consideration of water availability and future demand.
- **Insurance, Pension Funds:** India has a huge reserve in insurance and pension segment and these funds can be utilized for financing water infrastructure projects directly or through the viability gap funding (VGF) scheme which is a one-time grant to augment public-private-partnerships (PPPs) projects to fill the funding gap and making projects commercially viable.
- **Development Finance:** Major development institutions such as the World Bank, Asian Development

Bank, JICA and others provide funding for water infrastructure projects and also explore blended finance and local pooled finance facilities to mobilize private sector investment.

- **Alternative Rate Structures:** Water tariffs can be designed in such a way that encourages efficiency and conservation. This practice not only saves water but generate money for infrastructure development and management by making everyone aware that water is not a free or infinite resource. Utilities can consider higher water

water infrastructure development and management to ensure that water is managed in a much more flexible, efficient and environmentally sustainable manner.

Given these dynamics, there should be an ongoing role for the private sector in the development of water infrastructure and public services delivered through it.

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



Subhash Sethi

rates for any water used beyond the fixed quantity which will also improve the efficiency of its system operations.

The Way Forward

Water infrastructure is the need of time as our existing infrastructure is on the verge of perishing.

But simply building additional infrastructure cannot enhance India's looming water-stress.

We need to consider a more integrated approach 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.



It gives me a deep satisfaction that we have been involved to provide clean drinking water facility to over 40 million people of our country.

in the state list. There is a need to recognize water as a finite and vulnerable resource. The government should take urgent action for comprehensive water legislation at the national level for effective water management, conservation, development and equitable distribution with regulatory authority to deal exclusively

to provide complete control of water infrastructure from source to tap, metering, and billing with cost implications. The return on investment in the water sector should be enhanced through regulations to make the sector a rewarding business proposition for the private companies. With a number of PPP proj-