Change is clearly written on the horizon for the water sector all over the world. Specifically, India's water sector is in need of modern state-of-the-art infrastructure facilities to provide drinking water to the country's 1.3 billion population, says **Rishabh Sethi,** Executive Director, SPML Infra Ltd.

PHOTO: SPML INFRA LTD

Change on the horizon

Why water scarcity?

- Increase in water requirements due to increase in population
- Easily available sources of water, tapped irrationally
- Contamination of available water sources due to increase in human activities
- Large-scale industrial development
- Water intensive agriculture produce
- Human needs and desire for higher standards of living
- Delay in infrastructure project initiation time due to increasing social and environmental concerns

Water supply system and health safety is critical globally and even more so in India for becoming an economically developed country in the years to come. Historically, India has been endowed with freshwater reserves but the increasing population and overexploitation of surface and groundwater has resulted in water scarcity. With such vast geographical spread, India's water demand and corresponding market is among the largest in the world with an annual growth rate of approximately 15 to 20 per cent.

Demand for water

India has only 4 per cent of the world's freshwater resources for its nearly 1.3 billion inhabitants, almost 18 per cent of the world's population. Water with no substitute continues to escalate at unsustainable rates, driven by economic development, population increase, agriculture growth and industrial expansion. The resources remain constant in terms of quantity whereas the quality is being systematically worsened as a result of human activities and their effects.

The demand for water is subject to three driving forces: rapid increase in population, improvement in quality of life, and climatic change that lead to an increase in extreme events both in frequency and magnitude. We assume that the average domestic water demand would increase from 85 litres per capita per day in 2000 to 125 in 2025 and 170 lpcd by 2050 whereas the urban water demand will be 200 lpcd in 2025 and 220 lpcd by 2050.

India today has the largest agricultural network in the world and is also the largest user of water for agriculture and accounts for about 70 per cent of the total freshwater abstraction. The industry accounts for 22 per cent of freshwater consumption and remaining 8 per cent is used by the households. India's total water demand will increase by 22 per cent or 833 Bm3 by the year 2025 and to 32 per cent or 900 Bm3 by 2050, from the year 2000 level of 680 billion cubic metres.

With rapid population and industrial growth, the domestic and industrial sectors will account for 85 per cent of the additional demand by 2050. It is also predicted that nine river basins, comprising 75 per cent of the total population, will be physically water-scarce and there will be regions with severely overexploited groundwater resources. Although future food demand can be met, the associated water use patterns will lead to a severe water crisis by 2050. It is projected that India's population will reach 1.64 billion in 2050; half of them urban and half of them rural would need 9 million hectare metres of water to meet their domestic needs.

Sinking water table

The per capita availability of freshwater in India was 5,177 cubic metres in 1951, which has reduced to 1,820 cubic metres in 2001 and 1,588 cubic metres by 2010-11. It has been projected that per capita water availability is likely to be reduced to 1,341 cubic metres by year 2025 and 1,140 cubic metres by year 2050.

PER CAPITA WATER AVAILABILITY IN INDIA

Year	Population (Million)	Per Capita Water Availability (m3/year)
1951	361	5,177
1955	395	4,732
1991	846	2,209
2001	1027	1,820
2011	1210	1,588
2025*	1394	1,341
2050*	1640	1,140

* Estimated

Source: Government of India

A recent Central Groundwater Board study across the country has a depressing result on the availability of groundwater in the country. Many water bodies and river basins are being exploited beyond their capacity and several of them are considered to be water scarce. Over 80 per cent of the domestic water supply in India is dependent on groundwater which is fast depleting. Water tables have fallen significantly in most areas. The situation is getting worse in Delhi; groundwater that was available at 20 ft deep in 1977 has depleted to 201 ft by 2010 and there is a significant pollution of groundwater from natural as well as manmade sources. The country will thus be water stressed even if the total available water is taken into account.

Treatment of wastewater

With the faster pace of urbanisation in the last one decade, one-third of India's population has become urban. It is expected that India's urban population by 2050 will reach 825 million from the existing 340 million. The growth of the Indian economy has also increased water usage across sectors. As a result, wastewater is increasing significantly and the facilities to treat them are not adequate even in the urban areas; the rural areas are not in focus as yet in India for the purpose.

Presently, only about 27 per cent of the generated wastewater is treated; the rest is discharged into ground and water bodies without any treatment. There is an urgent need for better infrastructure and organisation with regard to wastewater management. Most of the existing facilities are conventional and not effective in terms of technology that is being used as per modern standards.

◀ The 35-mld Bawana common effluent treatment plant in Delhi.

A study on wastewater shows that 71 top Indian cities produces nearly 40,000 million litres of wastewater per day. Whereas, the sewage treatment capacity developed so far is only around 12,000 million litres per day. The Central Public Health and Environmental Engineering Organisation have estimated that 70-80 per cent of total water supplied for domestic use gets generated as wastewater. It is projected that by year 2050, about 132 billion litres of wastewater will be generated per day. This will create a difficult scenario, reduce freshwater availability and increase wastewater. The large gap between wastewater generation and treatment has led to large scale groundwater contamination that causes waterborne diseases in the country, affecting 38 million people annually including the death of 1.5 million children from diarrhoea alone.

PPP in water sector

Large investments are needed to develop and upgrade water supply, treatment and distribution networks. Since most urban water service providers are government-owned or regulated bodies, it becomes difficult to develop and maintain the infrastructure with complete government support and in many cases the required resources are not available. This has forced government to look for support from private sector for infrastructure development and public services through public-private partnerships.

SPML is executing a number of PPP projects in water sector and has demonstrated that efficient management along with proactive operation and maintenance can improve water management and distribution services.