

Water is everyone's business

Susnato Sen, practice head, infrastructure, Tata Strategic Management Group, discusses the ways that people, especially in countries such as India, can work to prevent the anticipated drinking water crisis

Water, water, everywhere, Nor any drop to drink.

Samuel Taylor Coleridge's ancient mariner was stuck in the middle of an ocean. Although there was water everywhere, it was salt water — unfit for consumption. A parallel can be drawn from that image to the current status of the world's water resources. Water is generally considered a 'free good', that is, abundantly available and unlimited in supply, given that three-fourths of earth is covered by it. However, the fact is that 97 per cent of the world's water is salty. Of the 3 per cent that is fresh, only one-sixth (0.5 per cent of all the world's water) exists in a form suitable for human consumption (the rest is contained in ice caps and glaciers).

Population growth and rapid urbanisation, increasing affluence and living standards, industrialisation and expansion of business activities, and climate change across the globe are increasing the demand for water. Thus, even though the world is not running out of water, it is not always available when and where it is needed. There is also a wide disparity in distribution of water resources globally — China and India, with more than one-third of the world's population, have less than 10 per cent of the world's water.

Water issues in India

India has nearly 4 per cent of the world's water resources. Of the average annual 1,869 billion cubic metres (bcm) of available water in India, only 1,120bcm are available for consumption. Surface water accounts for

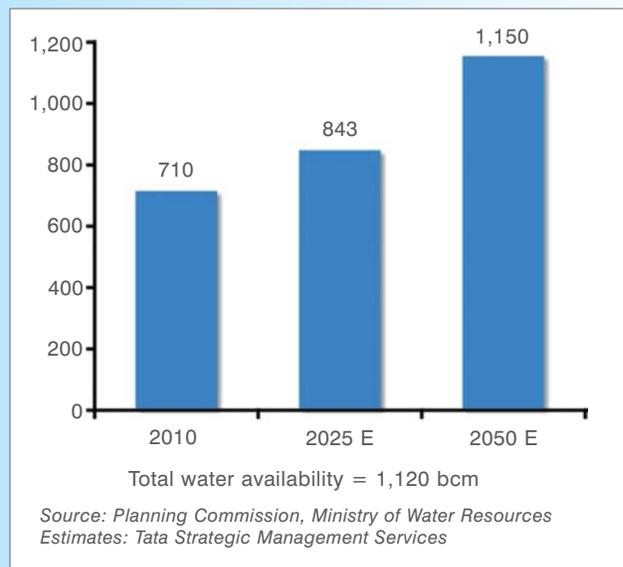


Fig 1: Water demand in India in billion cubic metres

nearly 60 per cent of that available water; the rest is groundwater. Due to some of the reasons mentioned above, demand for water has been growing at a rapid

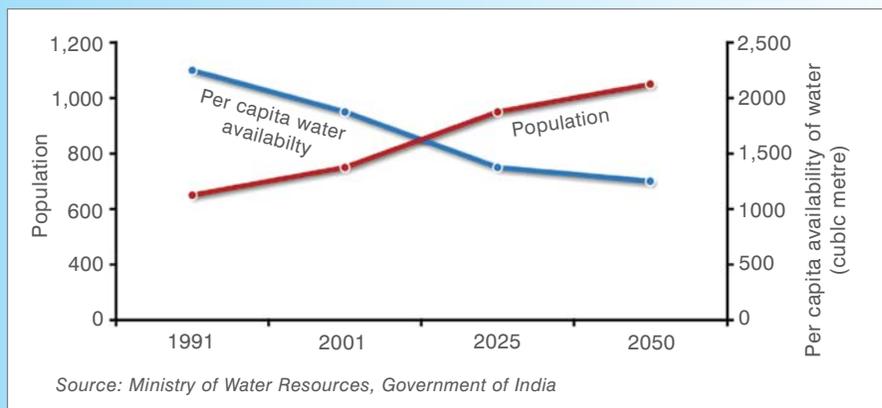
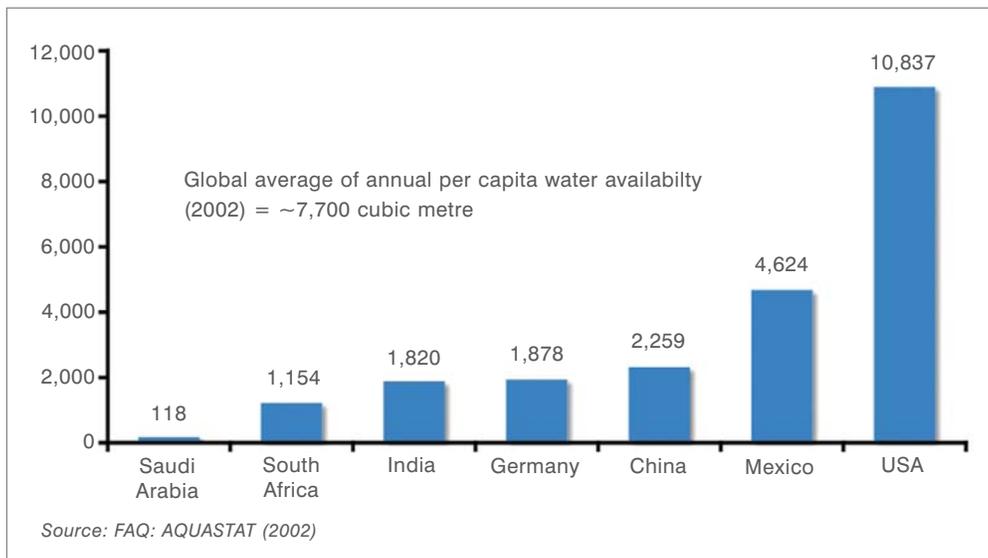


Fig 2: Per capita availability of water (cubic metre) vs population growth in India

Fig 3: Annual per capita availability of water



pace. The demand for potable water, currently estimated at 710bcm, is expected to increase to nearly 1,150bcm by 2050, thus exceeding the supply (see Fig 1).

Though India currently has adequate water resources, an analysis of the water availability on a per capita basis indicates that India is moving towards a classification of 'water stressed', ie, less than 1,700 m³ / person / year (see Fig 2). Also, India has lower average per capita water availability than other countries (see Fig 3). The heterogeneity in water availability across the country, given the wide variation in rainfall, only exacerbates the situation.

Also, the present infrastructure in the country is limited, in terms of long-distance transmission lines or canal networks, in its ability to carry water from regions with water surplus to regions with water scarcity. Thus, in arid regions in India, women and children wake up early to travel long distances to collect water. The situation in urban India is also quite dismal; most of the cities receive very limited water. Often, the freshwater that is available in rivers or lakes is contaminated from untreated industrial or household wastewater that is released into it.

All these have led to increasing dependence on groundwater. The result has been a steady depletion in the groundwater levels in many parts of the country. In Punjab, for example, while groundwater has helped the agricultural sector flourish, there are reports of groundwater being overdrawn in several blocks of the state. This has led to an alarming deterioration in the quality of water, which then leads to diseases such as fluorosis and cancer. Similar cases of overdrawn groundwater are prevalent in water-starved states like Gujarat and Rajasthan. So, what are the possible solutions to this impending water crisis?

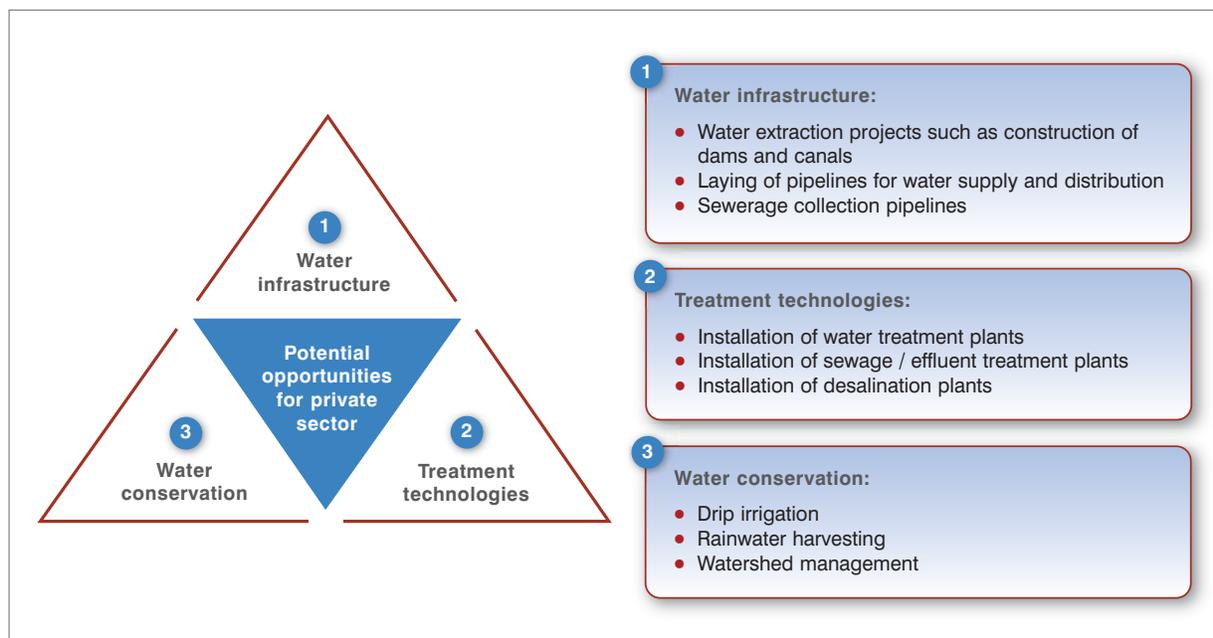
Emerging solutions

There are many ways to save and conserve water. It is critical however that users, namely those in the agriculture, industrial and household sectors, become aware that water needs to be conserved and used efficiently. The large costs involved in building dams and the rapid decrease in groundwater levels are forcing people to find newer means of water provisioning and of conserving existing water.

In this regard, one of the solutions is rainwater harvesting, an age-old technique of collecting, storing and recycling rainwater (both surface and subsurface) for irrigation and other uses. In India, several state governments have made rainwater harvesting mandatory. In cities such as Ahmedabad, Mumbai, Bangalore and Indore, rainwater harvesting is mandatory for all buildings covering an area of over 1,500m². Rainwater harvesting is also practised globally. At the Frankfurt Airport in Germany, water is collected from the roofs of the new terminal, stored in underground tanks, and later used for flushing toilets, watering plants and cleaning. This results in annual water savings of approximately 100,000m³.

The need to reduce one's water footprint in irrigation has led to the emergence of low-pressure micro-irrigation techniques such as drip irrigation and sprinkler irrigation, which save about 40 per cent of the water used by traditional methods. Wastewater treatment represents a promising solution to the issue of water scarcity. It consists of physical, chemical and biological treatment that generates recycled water, which can be used in a variety of non-potable applications in the industrial and agriculture sector, environment and recreation, and also for groundwater recharge. Using suitably advanced technology, treated

Fig 4: Potential private sector opportunities in water sector in India



water that is equivalent to drinking water can also be obtained. In Tokyo, municipal wastewater is passed through sand filters and then chlorinated for use in toilet flushing in business facilities. Florida uses treated wastewater for more than 50 per cent of its requirements.

While there are several innovative ways to manage existing water resources, there is also a need to explore potential new sources. Many coastal regions are looking at desalinated seawater as an alternate source of water. The fact that desalination technology is an expensive option, compared to conventional sources of water, has been the main reason for its limited adoption.

The Government of India (GoI), through various policies and regulations, is trying to encourage the conservation of water as well as the reduction of water pollution (see Fig 4). It is also encouraging solutions for wastewater treatment. Schemes such as Jawaharlal Urban Renewal Mission aim to develop infrastructure in cities and towns with financial assistance in the form of grants. The water and sanitation sector accounts for nearly 50 per cent of the total allotted projects.

Water as investment opportunity

To succeed, the possible solutions to the water scarcity would require large investments. These investments may create new water assets or help operate and maintain the existing assets. In this regard, the private sector could play a major role in procuring the necessary financial resources as well as

the technical and managerial efficiency in managing such water projects. The GoI is encouraging private participation in this sector through public-private partnerships (PPPs). Measures like viability gap funding are in place to enhance the attractiveness of water projects. Tata Strategic Management Services estimates the investment potential in the water sector at around \$10–12 billion (constant price) annually over the next 10 years.

A major share of these investments will be in civil work projects in irrigation and water supply / distribution space. Increasing government focus on reducing water pollution and the need to tap into new water sources are creating lots of opportunities in segments like water and wastewater treatment and desalination. Examples of such initiatives include the Tirupur Water Supply project, on a build-operate-transfer basis, a service contract for Navi Mumbai domestic water supply and, in Chennai, a water desalination plant functioning on a build-own-operate-transfer basis.

Given the high demand across the value chain, the water sector seems poised to emerge as a “sunrise sector” of the next decade. This certainly presents business opportunities for the private sector. In this regard, the government should create an enabling policy framework for PPPs in the water sector, placing particular emphasis on the rationalisation of water tariffs. This would go a long way in boosting the attractiveness of water projects and create solutions that will be necessary to avert the impending water crisis. ●