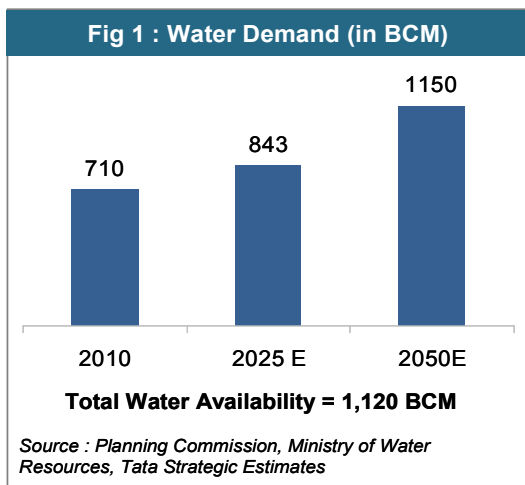


Water is everybody's business

"Water, water, everywhere, nor a drop to drink" – Samuel Taylore Coleridge's Ancient Mariner was stuck in the middle of an open ocean. Although there was water everywhere, it was not fit for consumption as it was salty. One can draw a parallel from the poem when referring to the status of water resources in the world today. Water is generally considered a "free good" that is abundantly available and unlimited in supply given that three-fourth of the Earth is covered with water. But the fact is 97% of the world's water is salty. Out of the 3% fresh-water only 0.5% is available for human consumption (rest is in form of ice caps and glaciers). Population growth and rapid urbanization, increasing affluence and living standards, industrialization and expansion of business activities and climate change are globally 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. Also there is a wide disparity in distribution of the water resources globally. China and India, with more than one-third of the world's population, have less than 10% of the world's water.

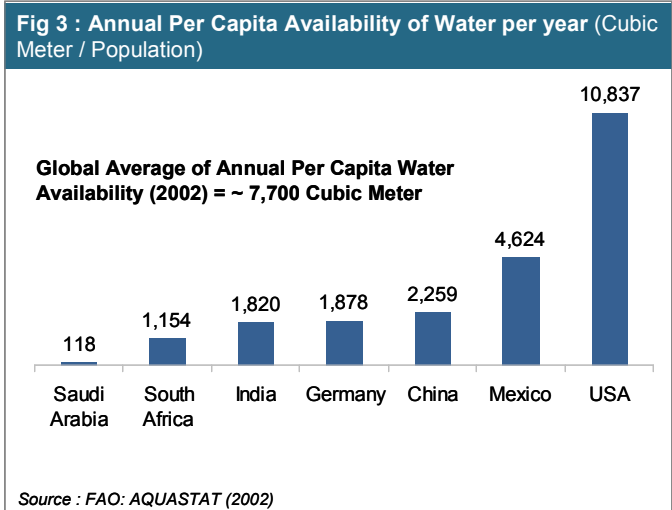
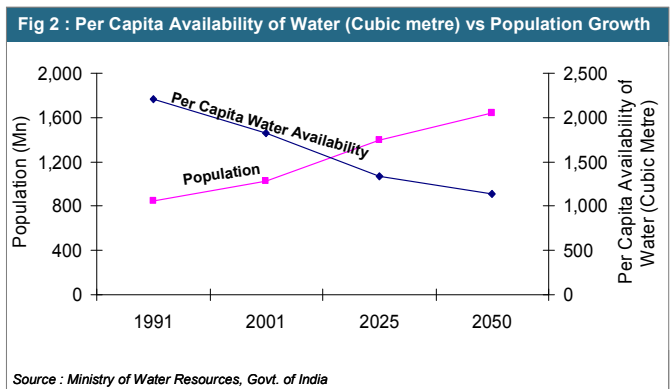
Water Issues in India

India has nearly 4% of the world's water resources. Of the average annual 1,869 Billion Cubic Metre (BCM) of available water in India, only 1,120 BCM is available for consumption. Surface water accounts for nearly 60% of the available water resources while groundwater resources account for the rest. Due to some of the reasons mentioned above, demand for water has been growing at a rapid pace in the past.



The water demand, currently estimated at 710 BCM, is expected to increase to nearly 1,180 BCM by year 2050, thus exceeding the supply (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 'water stressed' (i.e. < 1,700 m³/Capita /Year) level (Fig 2). Also, India compares lowly in terms of per capita availability of water when compared to the global average (Fig 3). The spatial unevenness 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 network of canals, to carry water from water surplus regions to water scarce regions. 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 with most of the cities receiving very limited quantities of water. Often the freshwater that is available in form of rivers and lakes

are contaminated as untreated industrial or household waste water is released into them. 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 flourish the agriculture sector, there are reports of groundwater being overdrawn in several blocks of the state. This has led to alarming deterioration in the quality of water leading to diseases like flourosis and cancer. Similar cases of over-drawing of groundwater are also extensively prevalent in water-starved states like Gujarat and Rajasthan.

So what are the solutions to this impending water crisis?

Emerging Solutions

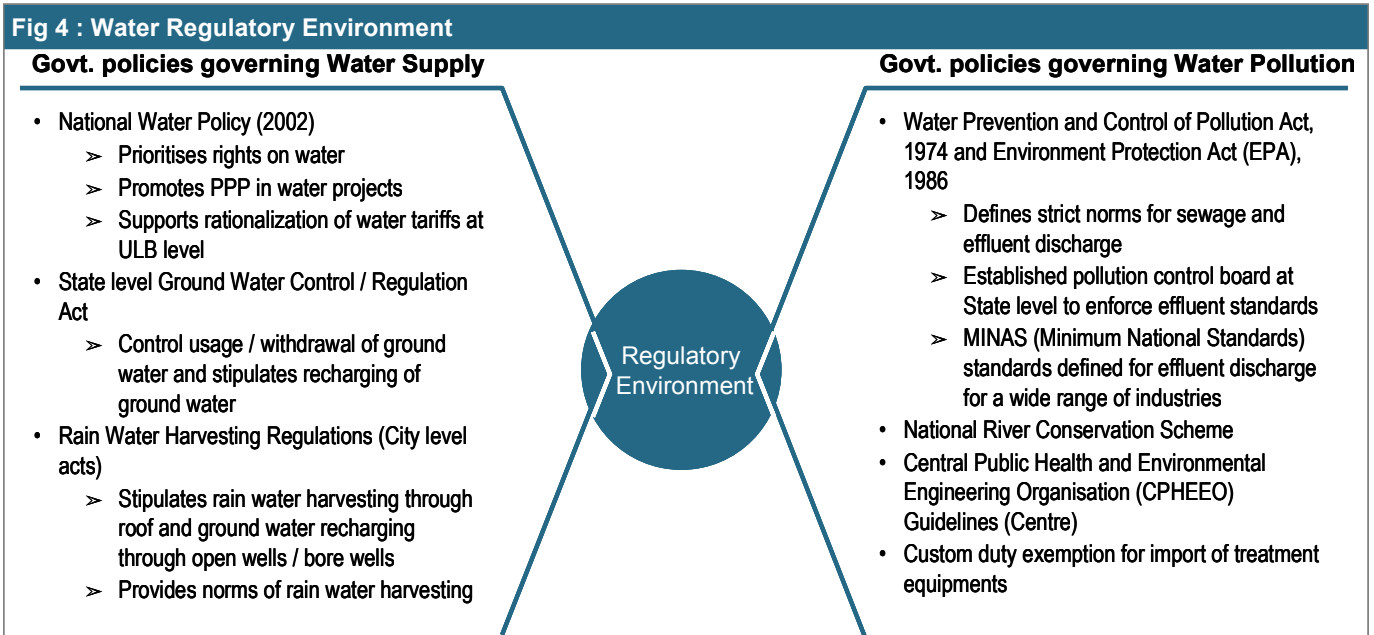
There could be many ways one can address the issue of saving and conserving water. For that, it is critical that users of this resource namely the agriculture, industry and the household sector become aware of the fact that water needs to be conserved and used efficiently. Large costs involved in building dams and rapid depletion in groundwater levels are forcing newer means of water provision/ conservation of existing water.

In this regard, one of the solutions is **Rainwater Harvesting**, an age old technique of the collecting, storing and recycling of rainwater (surface/subsurface) for irrigation and other uses. In

India, several state governments have made rainwater harvesting mandatory. For example in cities like Ahmedabad, Mumbai, Bangalore and Indore, rainwater harvesting is mandatory for all buildings covering an area of over 1,500 square metres. Rainwater harvesting is also practiced globally. At the Frankfurt Airport, Germany, water is collected from roofs of the new terminal in underground tanks and is later used for toilet flushing, watering plants and cleaning. This results in savings of approximately 100,000 m³ water/year.

The need to reduce water footprint in irrigation is leading to the emergence of low pressure **micro-irrigation** techniques such as **drip irrigation** and **sprinkler irrigation** that save about 40% water as compared to traditional methods. The **wastewater treatment** represents a promising solution in addressing the water scarcity issue. The wastewater treatment consists of physical, chemical and biological treatments leading to generation of recycled water, which can be used in variety of non potable applications in the industry and agriculture sector, environment & recreation and also for groundwater recharge. With usage of suitable technology, treated water equivalent to drinking water can be obtained. In Tokyo, municipal wastewater is treated through sand filters and then chlorinated for use in toilet flushing in business facilities. Florida uses treated wastewater for more than 50% of its requirements.

While there are several innovative ways to manage the existing water resources, there is also a need to



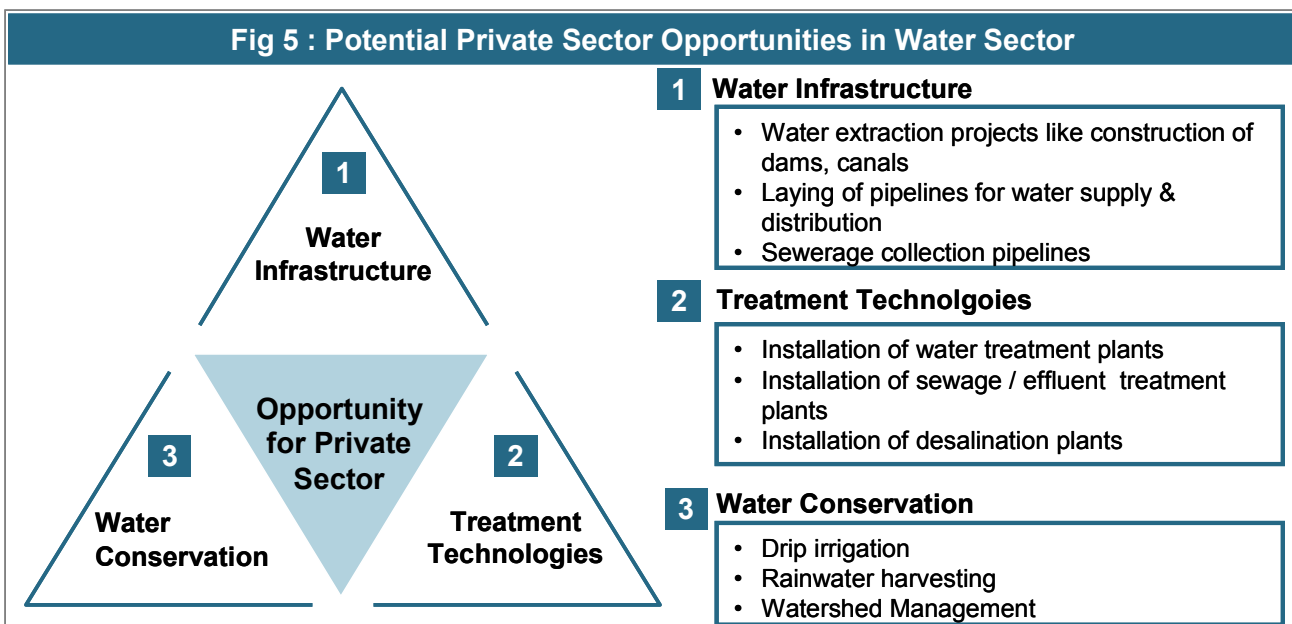
explore newer sources of water. Many coastal regions are looking at the desalinated seawater as the alternate source of water. The fact that **Desalination** technology is an expensive option, in comparison to conventional sources of water, has been the main reason for its limited adoption.

Government of India, through various policies and regulations, is trying to encourage conservation of water as well as reduction of water pollution (Fig 4). It is also encouraging solutions like rainwater harvesting and wastewater treatment. Schemes like Jawaharlal Urban Renewal Mission aim to develop infrastructure in cities and towns with financial assistance in forms of grants. Water and sanitation sector account for nearly 50% of the total allotted projects.

potential ~ USD 10-12 Bn (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. Also, 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 (Fig 5). Examples of such initiative include Tirupur Water Supply project on BOT basis, Service Contract for Navi Mumbai domestic water and Chennai water desalination plant on BOOT basis.

Given the abundance of demand across the value



Water as an Investment Opportunity

The solutions to addressing the water scarcity need large investments. These investments may be for creation of new water assets or for operating and maintaining the existing assets.

In this regard, private sector can play a major role in bringing in the necessary financial resources as well as technical and managerial efficiency in managing such water projects. Govt. of India is encouraging private participation in this sector through PPP arrangement. Measures like Viability Gap funding are in place to enhance attractiveness of water projects. Tata Strategic estimates the water sector investment

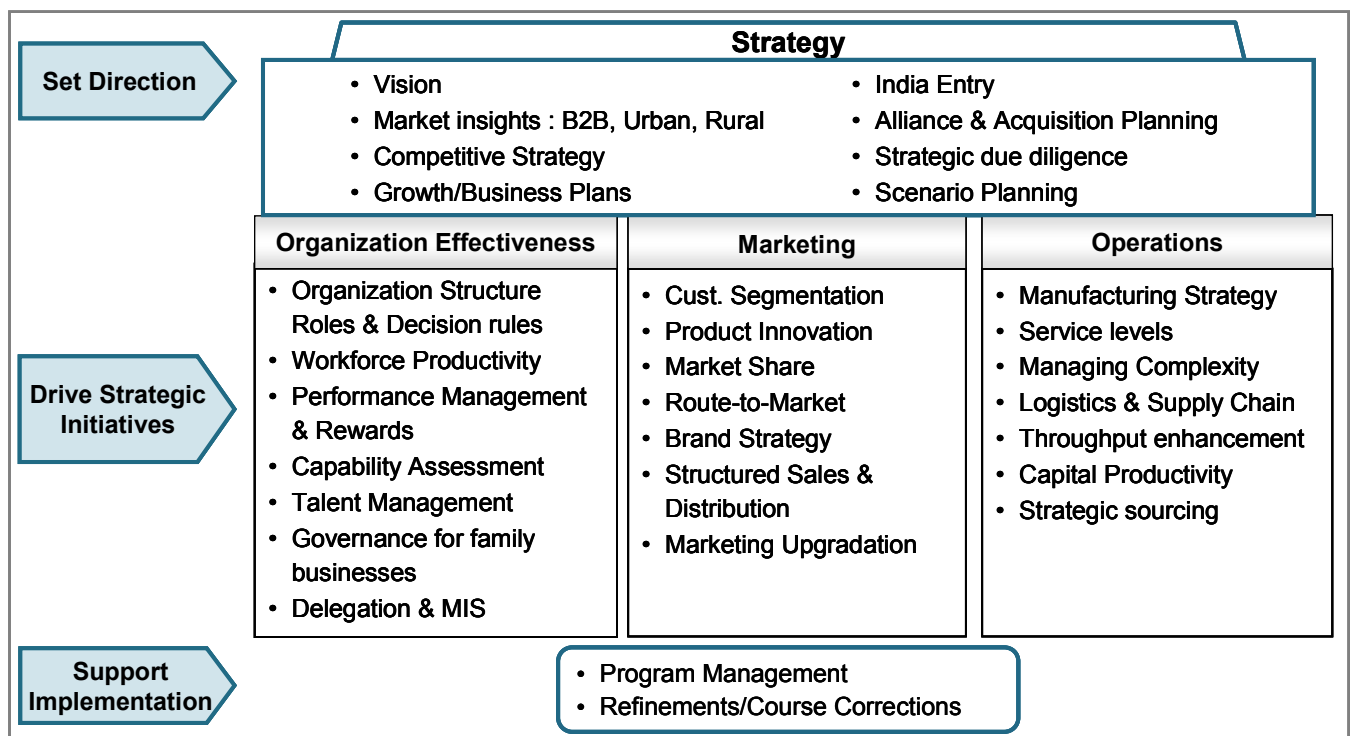
chain, the water sector is truly emerging as a “Sunrise sector” of the next decade. This certainly presents business opportunities for the private sector. In this regard, the Government should create an enabling policy framework for PPP in water sector with particular emphasis on the rationalization of water tariffs. This would go a long way in boosting the attractiveness of water projects and create solutions much necessary to avert the impending water crisis.

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About the Author:

Susnato Sen is the Practice Head for Infrastructure at Tata Strategic Management Group. He has more than 17 years of experience in the Infrastructure sector including Transportation, Special Economic Zones, Real Estate / Land Development, Tourism, Water & Healthcare. He has worked extensively with the Government, multilateral agencies and the private sector. His experience spans across the areas of Business planning & Feasibility Studies, Competitive / Growth Strategy, Commercial / Market Due diligence and Business Process Improvement.



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