WASTEWATER: THE ECONOMIC RESOURCE

By Subhash Sethi

42 MLD Sewage Tretament Plant, Kanpur

Water is becoming scarce and it is not far away that it may be treated as the new oil of future with serious economic, social, political and environmental considerations. Being world's fastest growing economy and home to 18% of the world population with just a friction of fresh water sources, India is being confronted with a serious resource challenge. The available water sources have reduced over the years whereas the demand keeps on escalating. The country's water demand is projected to very soon overtake the availability. With rapidly changing urban face of India and increasing demand for more quality water and better sanitation services, the most important issue we are facing is to deal effectively with our wastewater. Reuse of treated wastewater is still at the nascent stage in India. We must treat wastewater as economic resource and promote the use of treated wastewater on a sustainable basis with integrated plan to maximize the collection and treatment to reduce our dependence on fresh water sources. Globally, many countries are using the treated wastewater for potable and non-potable purposes.

The Population Division of the Department of Economic and Social Affairs of the United Nations have been issuing revised estimates and projections of the urban and rural

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70 MLD STP, Nasik, Maharashtra

populations of all countries in the world. It suggests that in the year 2020 about 56.2% of the world's population was urban and half of these people lived in towns of less than 500,000 inhabitants. The urban population of the world has grown rapidly from 751 million in 1950 to 4.38 billion in 2020. This urbanization trend will continue to rise and 68% of the world population, almost 6.62 billion people is projected to live in urban areas by 2050. World's urban population is growing by 60 million persons per year, about three times the increase in the rural population. The movement of people towards cities due to economic activity and employment opportunities, particularly in the less-developed regions has accelerated the demand for water, while the volume of generating wastewater both from the domestic and industrial activities have increased multifold.

> ***Singapore smart wastewater management systems help in meeting 40% of water demands of the country including drinking water.***

Water Conundrum

The major challenge in urban India is that estimated 80% of water supplied to household is coming back as wastewater to be treated and reuse. But in reality, only a fraction of it is treated due to insufficient treatment facilities and not being reused due to lack of infrastructure support. This leaves a big gap of generated wastewater is not being treated and untreated it is released to water bodies thus contaminating the already depleting groundwater sources. From the public health perspective, impact of water borne diseases in the country affects almost 40 million people annually including the death of 1.5 million children from diarrhoea alone. There is an ardent need to think deeply and adopt new perspective towards wastewater to counter the water scarcity and other challenges and work towards an enduring solution.

Wastewater Scenario

India is grappling with the massive challenge of shrinking water sources and increasing demand. Currently, about 94% of the population have access to some form of drinking water while only about 40% population have access to organized wastewater management services.

Almost 80% of domestic water supply flows back as wastewater and estimated 63% of municipal and 40% of industrial wastewater is left untreated and discharged into water bodies, a critical environmental and health hazard. India which has the inbuilt capacity to treat approximately 37% of its municipal wastewater, around 23 billion liters per day against a daily sewage generation of approximately 72 billion liters according to a report. Similarly,

12.5 MLD Effluent Treatment Plant, Bahadurgarh Industrial Area, Haryana

35 MLD CETP at Bawana, Delhi

about 60% or around 8 billion liters of industrial wastewater is receiving any form of treatment against the generated about 14 billion liters every day. The wide disparity has dire consequences on public health as water borne diseases affect almost 40 million people annually with nearly 7 lakh premature deaths are attributed to contaminated water alone.

It is calculated that if all available sewage generated by the entire world is collected and treated, it may potentially generate around 210–300 TWh of energy which can meet the needs of 27–38 million people. Meanwhile, if all available food waste are also collected and recycled along with wastewater, there is a potential to generate 880 to 1,100 TWh of energy, which can meet the electricity needs of 112–135 million people around the world. Although, it is easier to calculate than implement at the global level. If India is able to manage collecting and treating all generated municipal and industrial wastewater to reuse it for irrigation and industrial purposes only, the water scarcity issues will be meticulously managed to a greater extent.

With rapidly changing urban face of India and growing industrial activities, demand for more water and better sanitation services are continuously increasing. The most important challenge before us is how to deal effectively with our wastewater to create economic resource as world over the wastewater is being treated to create the 'new water'.

Learning from the World

Globally, the wastewater management concept endorses utilization of wastes as a by-product to the extent possible i.e. Recycle, Reclaim, Re-use and Recharge. Fundamentally, wastewater reuse have to take into consideration rapidly depleting water sources, water contamination, environmental degradation, rigorous policies, and health risks to people. The potential for wastewater treatment and reuse is dependent on a variety of factors and differs from one region to another. Industries consuming large volume of water apparently have greater potential for internal reuse.

Singapore has successfully adopted smart wastewater management system to meet 40% of their fresh water demand which they have planned to increase to 50% by the year 2030. It is also doing experiment with co-digesting the food waste and used water sludge to enhance the process that can provide triple biogas yield, compared to the treatment of used water sludge alone. Singapore's Public Utilities Board (PUB) and the National Environment Agency (NEA) have commissioned the collection and transportation of source-segregated food waste to the Water Reclamation Plant for co-digestion with used water sludge to produce energy. It is not only augmenting the water source but also making economic benefits with generated energy.

In Netherlands, a water utility that provides drinking water to 2.5 million consumers and businesses offers treated or process water that is customized for specific requirements and preferences of each customer. It focuses on providing process water to the chemical industry, petrochemicals, and food industry with an overall emphasis on tailoring water to the needs of the customers. The utility delivers different process water based on a design, build, finance, and operate project.

The Flanders in Belgium provides tailored water for industry and service business customers. The water utility's Industry and Services Business Unit charts the company's internal water streams, analyses sources of available water, including groundwater, surface water as well as wastewater or reusable

process water, and seeks ways of optimizing water consumption. The quality of treated water supplied depends on the customer's requirements. They usually carries out industrial water projects according to the concept of design, build, finance and operate contracts enabling large industrial units to make informed decisions on investments and suitable technique.

In Australia, Queensland Urban Utilities supports the sustainable use of recycled water across its service territory with numerous environmental benefits including conservation of water resources, reducing pollutants being released into waterways, and improved quality of public assets and supporting agriculture where sources of water are insufficient. A key aspect of the utility's recycled water program is that recycled water must be fit for purpose. It provides various qualities or classes of recycled water treated to meet the customers' specific requirements for industrial process, irrigation, processing of food crops, manufacturing facilities and others.

Worldwide, such examples are becoming common as water source is depleting with high level of contamination. To ensure industry has access to adequate supplies of good quality water and maintains productivity, utilities have been researching and developing 'non-conventional' sources for large-scale customers. Treated water is used as the main source of potable water in Namibia. China has developed wastewater reuse network across Beijing and almost 22% of total water supplied in the city is reclaimed water.

Our Contribution

Through our efforts in SPML Infra Limited, we have designed and constructed a large number of wastewater treatment plants for both sewage and effluents and have contributed immensely for environmental sustainability by effectively managing municipal and industrial wastewater and not allowing it to harm our ecosystem. Recycling wastewater further enhances reuse and social responsibility conforming pollution control norms. SPML Infra has built plants which are fully equipped with automation system and reliable treatment technology for efficient operation and maintenance. It has proven domain expertise of over four decades in water and wastewater management across the country.

The Way Forward

Wastewater recycling offers an intelligent solution for controlling water scarcity that could benefit all parties involved. The government should provide a clear regulatory framework, tariff regime and risk mitigation instruments, and all water utilities and municipalities in the country can be convinced to create robust and technologically advanced wastewater treatment infrastructure to fully utilize the reclaimed water. A market for treated water can be created to maximize the circular use of water with unclaimed economic benefits. There can be a differentiated tariff structure for select consumer categories such as agricultural and industrial users and freshwater conservation can be encouraged.

India needs to push for greater efficiency, effective control, management and reduction of wastewater through a comprehensive and well-planned strategy. At the current rate of water consumption, we will only have half the water we require by the year 2030.

It is crucial that all stakeholders in water segment must work together to find the solution to growing water demand with wastewater reuse at greater level and make this waste an economic resource.

About the Author

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