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GUEST EDITORIAL

India's unsustainable water development

Everyone appreciates that water security is an important issue for India. However, water management has been on an unsustainable path for centuries. Water security has progressively deteriorated over the years for many reasons. First is population growth. In 1947, total population of undivided India was 390 million. By 2050, it is estimated to reach 2206 million, a 5.66-fold increase in around 100 years. Second is rapid urbanization. In late 1980, India did not have a single megacity with more than 10 million people. Today it has five: Delhi, Mumbai, Kolkata, Bengaluru and Chennai. Soon Hyderabad and Ahmedabad will join them. Third is India's economic growth. As the country has industrialized, its industrial water requirements have gone up significantly. Between 2000 and 2025 it is expected to increase three-fold.

As population, urbanization and industrialization have increased, more water is needed for production of food as well as generation of electricity for supply to urban areas in ever-increasing amounts. While Central and State Governments always focused on increasing water supply to meet higher demands, no serious effort has ever been made to manage, and efficiencies of water uses in domestic, agricultural and industrial sectors can be significantly improved through better management practices, including the use of economic instruments, adoption of new technologies and instilling a conservation ethos among all Indians to value, preserve and protect water.

In addition to water availability problem, India is also facing an even more serious issue of water quality. Decades of neglect have affected all water bodies in and around urban centres, which are now seriously polluted. Situation is so bad that I do not know a single household in urban India that dares to drink water straight from the tap!

To survive and cope with poor water situation, each household in India had to turn itself into a mini utility so that it can convert 3–5 h of interrupted water supply during the day into a continuous water supply on a 24 × 7 basis. Individual houses have installed their treatment systems to ensure that water can be drunk without health concerns.

Consider the following facts. Currently only about 10% of India's wastewater is collected, taken to treatment plants, properly treated and then safely discharged into environment. Even for its capital, New Delhi, nearly all its domestic and industrial wastewaters are discharged untreated to the River Yamuna, which makes this section of the river an open sewer. There is virtually no effort by any Indian state to control or manage agricultural non-point pollution arising from fertilizers, pesticides and their derivatives.

Accordingly, all water bodies, including rivers, lakes and aquifers, within and near urban centres are now heavily contaminated with all types of pollutants. The situation is getting progressively worse as appropriate and timely actions by the administration are still unsatisfactory.

Current wastewater treatment facilities in India leave much to be desired. A significant part of the urban centres is not sewered and thus all wastewater generated cannot be taken to treatment plants. Even when wastewater is taken to treatment plants, poor operation and maintenance of these plants ensure that they are either non-functional or are working at much reduced efficiencies after only 3–4 years of construction.

The problem is further compounded by insufficient water quality monitoring by the Indian water authorities. If an institution currently monitors 20–25 water quality parameters regularly, it will belong to the top 5% of the Indian institutions. Another developing country, China, now regularly monitors over 110 water quality parameters all over the country. A city like Singapore monitors 352 water quality parameters. India has much to catch up in such monitoring.

Social and economic costs of not treating all heavily contaminated wastewaters generated are already quite high and increasing steadily with time.

Indian utilities, for the most part, heavily subsidize water. In some states like West Bengal water is free. In Delhi, a family of five, using an average of 130 litres per person per day, need not pay for water. Therefore, there is little incentive for most Indian households to use water efficiently.

India's poor water management practices, both in terms of quantity and quality, were not serious issues even in 1960s, because its population, urbanization and economic growth were not large. The situation has changed dramatically since 1970s, when the domestic water supply problems have steadily worsened.

Much of the water use in India, say 75–82% is for agriculture. The domestic sector uses probably about 5–6%,

followed by the industrial sector. Although anecdotal evidence indicates that in India, like in most other developing countries, the share of agricultural water is gradually declining and industrial water is increasing, in real terms, total water use for agriculture is probably increasing. Thus, if India has to become water-secure, the share of water for agriculture must be efficiently managed and reduced. Agricultural water use has always been inefficient. It has worsened from the early 1970s, when the World Bank insisted that for agricultural loans, farmers must have free and 24 h supply of electricity so that they can pump groundwater. Not surprisingly, this policy was successful in increasing food production over the medium term, but at very high medium- and long-term economic and environmental costs. Free electricity to the farmers has resulted in at least two major problems. First, during the following decades, all State Electricity Boards had major financial problems. Since then, there has been some tinkering with the policy of free electricity supply to farmers. However, as known all over the world, once a subsidy is provided, it is politically difficult to withdraw it.

Second, Farmers are withdrawing too much water, much more than what crops require. As a result, groundwater levels in large areas of India are declining steadily. In certain parts, groundwater levels are declining by 3–4 m/yr. In India's breadbasket Punjab, groundwater levels have been in a steady decline for the last 4–5 decades. Similar situations can be observed in most other Indian states, including Rajasthan, Haryana and Maharashtra. Indo-Gangetic aquifer is the second most depleted aquifer in the world. All these have medium- to long-term implications for India's water security.

As groundwater levels decline, farmers need more electricity to pump water from greater depths. This increases the financial losses suffered by electricity supply companies. Also, farmers must install higher capacity pumps regularly so that they can lift water from deeper and deeper levels. Accordingly, sustainability of groundwater management in India is becoming a dream.

Despite the work of Central Ground Water Board, little reliable information is available on where the aquifers are, what are their sizes, how much water they contain, what are their annual recharge or depletion rates, and their qualities. Without such essential information, it is impossible to develop plans as to their sustainable use.

While India's water future currently looks bleak, there is no reason why it should be so. The country has enough expertise to solve its water problems. It has access to technology and investment funds to ensure a sustainable water future. For this, 'business unusual' solutions need to be implemented. Only a few solutions will be discussed here.

There is currently not even a single Indian city where any household receives water that it trusts to be fit to drink. Most Indian households do not even receive 24 × 7 water supply from water utilities. This is not because utilities do not have enough water to provide all households 24 × 7 supply. Due to decades of continuous poor management of water utilities, Indian households have been forced to become 'mini' water utilities. Most households receive 2–4 h of water supply a day. They have constructed underground tanks to store water. They also have overhead tanks to which water is pumped from underground tanks. Thus, utilities may provide intermittent water supply but the Indian households have converted it to 24 × 7 water availability. The water that comes to a house is then treated so that its quality is improved. At simplest level, treatment may mean boiling water. Well-off families mostly use reverse osmosis (RO) to purify the water for drinking.

If Indian megacities make a simple institutional change, most of their water problems could be solved. They must headhunt the best persons available to run them (not draw from the IAS cadre) and give them appropriate key performance indicators (KPIs) for an initial term of three years. Their performance should be objectively evaluated every year. If they reach, or exceed their KPIs, their term of office could be extended. If this simple institutional change can be made, 60–70% of the problems of utilities would be solved with the available budget and technology, within a decade. Also, the elected politicians should not influence day-to-day operational and management decisions. They should set medium- to long-term goals, but should not micromanage the water utilities.

Managing water utilities is not rocket science. Consider the city of Phnom Penh, Cambodia, which has less expertise at every level and access to less technology than any major Indian city. Phnom Penh Water Supply Authority (PPWSA) has been providing its citizens with clean, hygienically safe water 24 h a day since 2000. It has detailed up-to-date technical information and long-term financial and development plans, which none of the Indians megacities seems to have. A fundamental question that India should ask is: if Phnom Penh in a less developed country can succeed in providing clean and continuous water supply to its inhabitants, why cannot the Indian utilities do so?

With respect to agricultural water management, India could see what another developing country, China, has achieved during the past 30 years. Around 1990, China's agricultural water management was inferior to that of India. Around 2000, China decided that by 2020, it would use 30% less water for agriculture without affecting food production. It achieved this goal and now plans further reduction in agricultural water use by another 20% by 2030. China will most likely achieve this objective as well.

If countries like Cambodia and China can significantly improve their water management practices and processes remarkably, there is absolutely no logical reason why India cannot do so.

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