

India's water future

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Introduction

Water planning in India has been on an unsustainable path for centuries. In the 16th century, Mughal Emperor Akbar decided to build a new capital in Fatehpur Sikri (City of Victory). In 1589, Robert Fitch, one of the earliest English travellers to India, noted that Agra and Fatehpur Sikri were "two great cities, either of them much greater than London and more populous".

The history of the new capital was not so auspicious. Akbar used it only for 13 years and then abandoned it completely to return to his old capital on a permanent basis. The main reason was very simple. There was not enough water in Fatehpur Sikri in the arid plains of northern India to function as an effective capital.

Fatehpur Sikri is a magnificent monument to India's poor water planning. Over the centuries India's water planning has improved only incrementally whereas its drivers of water uses have increased exponentially.

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Consequently, the complexities and magnitudes of water management in the country have steadily increased. Sadly, even though India has now become a major global economy power, its water management practices and processes are at least 50 years behind time. Thus, not surprisingly, all over the country, there are continuous signs of water stress because of scarcity or excess of water, as well as its quality and reliable availability over both space and time.

Drivers of India's increasing water requirements

There are many drivers for steadily increasing water use. Some of these drivers have been traditional and recognized for centuries. Others are non-traditional and are of comparatively recent origin. Among the traditional factors are increasing population, rapid urbanization, escalating demands for food and energy, accelerating industrial and commercial activities, as well as changing technologies and lifestyles.

Among the non-traditional and recent ones are steady economic growth which is changing the nature and magnitudes of water requirements, both in terms of quantity and quality and over space and time, higher education and skill levels which are contributing to higher income levels as well as to meet increasing aspirations and expectations of the average Indians. All these activities

invariably require water since it is one of the threads which interlink them.

Population has been historically a major driver of increasing water use. In 1947, the total population of undivided India was 390 million. By 2050, total population of the three countries that constituted undivided India will be 2,206 billion, a 5.66-fold increase in little over a century. Furthermore, India is expected to overtake China by 2022 as the most populous country of the world. By 2050, India is estimated to have 400 million more people than China.

Population growth and scientific and technological advances and steadily higher standards of living have contributed to exponential growth in human activities over the past century. This has resulted in higher water requirements for all types of water uses: human, thermo-electric, industrial and agricultural. Sadly, because of consistent bad planning and management, efficiency of water use in all sectors has only increased marginally.

In addition, for centuries domestic and industrial wastewaters have been indiscriminately discharged into water bodies without any, or at best, partial treatment. Consequently, all water bodies within and near population centres have already been contaminated seriously with domestic and industrial pollutants. This has posed serious health and environmental problems. This has also meant that some water sources have now been so polluted that they cannot be used for many purposes without additional expensive and sophisticated treatments.

Along with population, another major factor over the past 60 years has been that India has witnessed steady urbanization. This has contributed to rapid growth of megacities, that is cities having more than 10 million population. At present India has five megacities: Delhi (26.5 million), Mumbai (21.4 million), Kolkata (15 million), Bengaluru (10.5 million) and Chennai (10.2 million). By 2030, two more will become megacities: Hyderabad (12.8 million) and Ahmedabad (10.5 million). In contrast, even as late as 1980, India did not have even a single megacity. The most populous Indian city then was Kolkata at 9.03 million. It was then 9th most populous city in the world.

During the past four decades Indian cities have undergone rapid urbanization. Delhi is now the most populous Indian city and is likely to grow even more. By 2030, Delhi's population is expected to increase by another 9.5 million people to become 36 million. This addition is almost another megacity.

The issue is with such rapid population growth cities like Delhi or Mumbai have simply been unable to provide basic services like clean water, proper wastewater and solid wastes disposal. Megacities like Delhi and Mumbai have also seen equally rapid growths of megaslums, primarily because of migration from rural areas. The city administration during the last 50 years never had the management and administrative capacities to cope with such rapid exponential growth. Pervasive corruption, perpetual rent-seeking by politicians, bureaucrats and business people have meant such

cities not only did not receive appropriate investment funds but also were seldom spent properly. Thus, not surprisingly, water supply and wastewater management in all Indian cities leave much to be desired.

Even though water and wastewater management practices and processes in the megacities are poor and will continue to be unacceptable over the next 2-4 decades, it should be noted that megacities are in much better shape compared to mid-size cities, and will remain so in the coming decades. This is because all the megacities are centres of political and economic power. These are places where the Indian elites live. They also have significantly better technical, managerial and administrative capacities than the mid-size cities. Thus, they are literally sucking in all types of resources from their hinterlands for their survival.

The mid-size cities do not have the same political, economic and media clout. Accordingly, in the coming years these mid-size cities are unlikely to prosper as much as the megacities, not only in terms of availability of clean water and sanitation but also are likely to lag all types of development needs which could provide them with a good standard of living and quality of life, including availability of food, energy and services like health, education, transportation and communication. This is a fact that has been consistently ignored by the Indian policy makers and bureaucrats.

In addition, with steady economic growth, higher literacy and increasing skill levels, the number of Indian middle class families

has gone up exponentially. This trend is likely to continue. The median income of Indian households is expected to reach over \$10,000, by 2030, in 2014 prices. One of the direct results of this affluence has been the rapid changes in dietary patterns and energy consumption levels of the affluent people which now number in hundreds of millions. As the country has prospered, the people have steadily moved to a much higher protein-based diet like milk products, fish and meat, all of which need significantly more water to produce than cereal-based diets. Their energy consumption also has gone up because of increasing use of air conditioners, refrigerators, washing machines and cars. All these need extra energy to produce and operate, and no energy can be generated without significant quantities of water.

Also, even though Central Electricity Authority claims that India will have electricity surplus of 1.1% in 2016-17, some 300 million Indians still do not have access to electricity. Power cuts in many parts of the country are still rampant, and India's per capita electricity consumption is significantly lower than the world average. It is even lower than a country like Bhutan. It is less than one-third that of China, which is another developing country. Thus, India will need to generate a massive quantity of electricity to meet the needs of all Indians and also meet their aspirations. This does not include an additional 400 million people who will need more electricity. These increases in generating capacity will mean tremendous needs for additional water for cooling. This will add to all the extra water needed for food, industrial and domestic sectors.

Accordingly, in terms of water, the country now is facing a perfect storm. This means water management practices and water use efficiencies in India need to change dramatically in the coming years. However, we do not see any sustained political will that will be absolutely essential to take some hard decisions in the future, either at the Central or state levels.

Interstate water disputes

The problem is further exacerbated by the fact that all important rivers in India are interstate, and water management is basically a state subject on which the Centre has very limited influence or control, except indirectly like provision of funds.

Because of poor water management in all the Indian states and steadily increasing water demands, India is now witnessing increasing conflicts on water allocations in interstate rivers. This has become a serious challenge to the regional stability of the country.

Interstate water allocation conflicts have triggered numerous protests, violence and property destruction. If these conflicts continue and grow, they may prove to be one of the biggest political constraints to India's future economic growth and social cohesion.

A major challenge now is the absence of permanent and efficient dispute resolution mechanisms for water allocation in interstate rivers. Under the Interstate Water Disputes Act of 1956, ad hoc tribunals can be established on a case by

case basis whenever conflicts between two states cannot be resolved by mutual discussion. The initial objective and expectation of this Act was to allow the states to discuss and resolve the conflicts before engaging in adjudication. This simply has not happened.

Our research indicates that interstate water tribunals have often contributed to long-drawn negotiation processes which have mostly led to hardening of the positions of the individual states, instead of promoting acceptable compromises. The Act has now become part of the problems rather than solutions. This Act should have been amended decades ago.

There are several problems with the existing tribunal system. First, there are no uniform, logical and common processes which could act as guidelines for the tribunals to follow. They have considerable discretions in terms of processes to arrive at settlements as also underlying concepts under which settlements are made. Fundamental assumptions have often varied from one tribunal to other significantly. Thus, not surprisingly states now are reluctant to accept its verdicts for one reason or another.

Second, tribunal results are non-binding to the states. Thus, there is no way states can be forced to accept the awards, especially when states consider them to be unjust, contrary to their interests and will not be acceptable by their people.

Third, the Centre has been consistently reluctant to establish institutions for implementing the awards. There are now

discussions to see what can be done, but whatever is proposed and accepted is likely to be too little, too late and unlikely to be a major improvement, in terms of time, acceptability to all the parties and effectiveness.

Fourth, there is no fixed stipulated timeframe for negotiations and adjudications. The Cauvery Tribunal took 17 years. Karnataka then promptly decided to file a Special Leave Petition to the Supreme Court to thwart the final award, further delaying the settlement. Currently, such adjudications are taking about 20 years. By then, most of the initial conditions would have changed, and thus the verdicts, whatever they may be, are mostly not acceptable to the disputing parties. Sadly, we have not seen even very preliminary discussion of how to formulate living treaties which could change with time and differing conditions, a fact that the country will have to face in the future.

An important factor linking water disputes to state politics is often the power of state campaigns in distracting voters from the real issues of poor governance and lack of administrative skills and actions. Unfortunately, water has now assumed the role of a political weapon for interstate water disputes. Because of the emotional nature of the water problems and the states are organized on a linguistic basis, it has been easy to inflame the people to believe the awards of the tribunals are unfair and unjust.

With a number of states defying orders of tribunals and recently even the Supreme Court, water is rapidly becoming an

important threat to India's federalism as well as to its future social and economic development and political cohesion.

Improving water management practices and processes

In order to ensure that economic growth and industrial developments continue, that enough food and energy are available for an increasing population demanding steadily improved standards of living and quality of life, one resource is absolutely essential: water. Demands for water are steadily increasing. However, its management practices are decades behind the time.

If current dysfunctional and inefficient water management practices continue, with a free or highly subsidized domestic water supply and excessive groundwater pumping with free electricity, the country will only get progressively worse.

Yet, India's water management need not to be so dire. Unlike oil or coal, water is a renewable resource. Oil or coal, once used, cannot be utilized again. With good water management practices, water can be used, wastewater can be collected and treated, and water can be reused. This process can continue indefinitely.

Yet, treatment of wastewater and its reuse are alien concepts in India. Estimates by the Third World Centre for Water Management indicate that less than 10% of wastewater generated is collected and properly treated. Unsurprisingly, all water bodies within and around urban centres are now seriously contaminated. This has

had significant human health and environmental costs, which are likely to increase at least over the medium-term.

With existing knowledge and available technology, water can be significantly better managed so that the country has enough water for all purposes—not only now, but also for the year 2050 when the population is estimated to be one-third higher.

Take domestic water supply. Indian norms should be based on scientific criteria and not plucked out of thin air. Currently, communities with over 100,000 people with flush toilets are expected to use 150-200 litres per capita per day (lpcd).

Many European cities, such as Leipzig and Tallinn, have already reduced their water consumption between 90–95 lpcd. For Denmark as a whole, the average consumption is 107 lpcd. Studies in Singapore indicate that once water use exceeds 80 lpcd, there are no incremental health benefits.

Indian urban utilities routinely lose 40–60% of water produced. In Tokyo, losses are 3.7%, Singapore 4.9% and a less developed Cambodian city, Phnom Penh, 6.5%. Instead of reducing these losses, in India, the preferred option has been to increase supply, even though nearly half of the new supply is unlikely to reach the designated beneficiaries because of system leakages, inefficiencies and unauthorized connections.

Herein lies one of the chronic and fundamental problems of India's water

management. The focus always has been on increasing supply. No effort has been made to manage demand and increase efficiencies. The general feeling of the politicians has been that there is enough water and it is the task of the government to provide free or subsidized water to all. There is not a single water utility or an irrigation authority in India that has a financially viable model.

Take the century-old conflict between Karnataka and Tamil Nadu over the sharing of Cauvery waters. On a dry year, with steadily increasing urban, industrial and agricultural demands, with no proper water management, there is simply not enough water in the river to satisfy all the demands unless they are managed.

Politicians of all parties seeking rural and urban votes have been reluctant to institute proper and equitable water pricing and thus take hard decisions. Water is also a very emotional issue. Thus, on 12 September, water riots in Bengaluru left two dead, 1000 vehicles burnt and 400 miscreants arrested. Major businesses like Infosys, TCS, Flipkart and Amazon had to shut their offices. Assocham estimated that Karnataka suffered losses of Rs. 22,000–25,000 crores.

Even though the Cauvery dispute is over a hundred years old, demand management has not entered in the agenda of either Karnataka or Tamil Nadu. Sadly, even now, basic hydrological, water use and demand data are not available to do any rational planning. The situation is very similar all over India.

Conclusions

In spite of the widespread belief, India is not facing a water crisis because of actual physical scarcity of this resource. However, it is facing a serious water crisis because of continuing poor management practices. Nowhere is the problem more obvious than in Cherrapunji, the world's rainiest city. With an annual average rainfall of 11,777 mm (463.7 in), it has been having serious water problems in dry months for over a decade.

In the absence of functioning water institutions and proper water management practices at central, state and municipal levels and lack of political will to take hard decisions at all political levels, water problems in India, in terms of quantity, quality and equity, will become increasingly more difficult to resolve. It proves Mark Twain's adage "Whiskey is for drinking, water is for fighting over."