Water Security in Urban India: Water Supply and Human Health

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Key Points

- Increasing urbanisation to 2030 will put further pressure on strained water infrastructure.
- Recognising that current practices are unsustainable, and implementing water conservation measures in urban areas, will take some of the pressure off declining groundwater supplies.
- Like their rural counterparts, many urban Indians continue to practice open defecation, which leads to an increased risk of infection and disease among the population.
- While the government’s sanitation plans are laudable, cultural change is also required to improve poor health outcomes.

Summary

Urban India faces considerable water security challenges that have the potential to worsen in the coming decades as the level of urbanisation continues to increase. A lack of investment in building and maintaining basic water and sanitation infrastructure is the main factor that has contributed to this problem. Other challenges, such as implementing cultural change around sanitation and hygiene practices, are also pressing issues. This has had an impact upon the health and wellbeing of urban inhabitants.
Analysis

Indian Urbanisation: Likely to Increase to 2030

Indian statisticians define urban areas as a settlement with more than 5,000 people, a population density of more than 400 people per square kilometre and at least 75 per cent of male inhabitants working in non-farm jobs. The proportion of the population living in urban areas, as set out by this definition, has increased in the past decade.

Nonetheless, urbanisation has progressed slowly in India. So slowly, in fact, that it has been labelled a “reluctant urbaniser” by some. In 2001, the percentage of the population living in urban areas was estimated to be 28 per cent. By 2011, this figure had increased to 31 per cent. Due to the size of the Indian population, however, this modest growth represents a considerably large number of people. In 2015, 377 million Indians live in urban areas. By 2030, the urban population is expected to rise to 36 per cent of the population, bringing the urban population to 590 million.

Unless serious attention is given to the shortcomings of water and sanitation infrastructure in many Indian cities, the health challenges outlined in this paper will become more severe.

Urban Slums: Increase in Absolute Numbers

It is estimated that about 15 per cent of Indians live in slums. The proportion of people living in slums has declined since 2000; however, the number has increased from 52 million in 2000 to 65 million in 2011.¹

Many of these slums are not notified by urban local bodies, meaning the community is denied legal access to public services, such as electricity, sanitation and water. Inhabitants can be evicted at any time and the government is not responsible for providing civic amenities of clean drinking water, solid waste collection, hygienic sanitation systems or health facilities. In 42 cities and towns, including New Delhi, only five per cent of piped water reaches slum areas. This leaves slum dwellers reliant upon, often exploitative, informal water providers.

While the urban population has better access to sanitation than in the past, coverage is failing to keep up with population growth. Many of the toilets that the government builds are provided on a pay as you go basis and many slum residents are unable to afford the cost of utilising them. The water and sanitation challenges that India currently faces are at risk of becoming worse as the proportion of the population living in urban areas continues to grow.

While inequality is a major component of urban India’s water challenges in many instances wealthy members of the population are also likely to experience water supply issues that impact their health as well.

Urban Water Challenges in India

The development of water infrastructure has not kept pace with the expansion of urban populations. Poorly maintained, leaky distribution networks and theft lead to large amounts of “unaccounted water”. A 2013 audit, conducted by the Office of the Indian Comptroller

and Auditor General, found that New Delhi loses 60 per cent of its water supply in these ways. Low prices are often cited as contributing to this problem, as they make it difficult for local government bodies to fund repairs and expand water infrastructure.

Urban water and sanitation is administered by the Ministry of Urban Development through the Ministry of Housing and Urban Poverty Alleviation. State governments determine the level of investment that urban local bodies (ULB) receive for water supply and sanitation. The ULBs are then responsible for providing drinking water and sanitation facilities in their jurisdictions. ULBs depend upon their state government for investment in the water supply system as in many cases they do not have the ability to generate enough revenue to be able to maintain the water supply network. Indian water utilities are also starved of revenue streams as water tariffs are often too low to cover operation and maintenance costs. ²

Urban water supplies are also being diminished as demand outpaces supply. Both ground and surface water sources supply Indian cities. As surface water sources are becoming depleted and more polluted many urban areas are increasing their reliance on groundwater. Increased demand for groundwater is putting pressure on urban aquifers which are no longer being recharged.

As a result of the poorly maintained water infrastructure and supply shortfalls, no Indian city has continuous piped water. When water is sporadically supplied it often requires further treatment as decontamination facilities are also poorly maintained and incapable of adequately treating water. Treated water is often recontaminated by old and poorly maintained pipes and even if they have access to piped-water, consumers often need to boil it before it is fit for consumption.

Wealthier citizens overcome the erratic water supply by utilising backyard bore wells, booster pumps or storage tanks. Poorer urban-dwellers and those that lack a connection to the water network rely upon communal taps or unofficial supplies of water.

In some Indian cities, such as New Delhi, the municipal government supplies potable water to deficit areas via trucks. This service has not been able to meet demand, however, and has not been able to put an end to private operators selling water illegally obtained from wells.

In areas that are not covered by government tanker services residents rely on private operators to alleviate water shortages. In many cities these private operators are referred to as the “water mafia”. These operators fill water tankers with water drawn illegally from diminishing groundwater supplies. None of the water is tested, nor is it treated. This water is then sold to city residents at inflated rates. This activity also makes it difficult for officials to monitor the withdrawal rate of water aquifers and implement water conservation policies.

Rather than focusing on demand-side reform the government has focused on increasing supply, which has proven to be more costly and has led to increased pressure on dwindling water sources. Most investment has gone towards surface water dams and canals for irrigation and pipelines for drinking water instead of funding water conservation efforts. The situation is currently unsustainable.

Sanitation in Urban India

As of 2015, Indians have almost universal, if sporadic, access to water. In 1990, 89 per cent of urban populations and 64 per cent of rural populations had access to improved drinking water sources. By 2015, these figures rose to 97 per cent and 93 per cent respectively. Sanitation, however, remains of great concern. Only 36 per cent of the population has access to sanitation facilities. Projections suggest that by 2025, the entire population will have access to water, but roughly half the population will continue to have limited access to sanitation.

In addition to their water supply woes, most Indian cities lack sufficient sewage treatment facilities. Many Indian cities treat only a small portion of the effluent (domestic and industrial wastewater) produced by their inhabitants prior to discharging it into rivers, seas and lakes. Across the country less that 80 per cent of it is treated before being discharged into the main sources of drinking water. The majority of sewage treatment facilities are concentrated in Delhi and Mumbai. These two cities generate roughly 17 per cent of the country’s sewage, but have close to 40 per cent of the country’s treatment facilities.

According to the 2011 census, only 32.7 per cent of urban Indians are connected to a piped sewerage system. As many urban citizens lack access to the sewerage system it is common for households to have their own septic tanks. Many of these tanks are improperly built resulting in their contents leaking into the groundwater supply. Nitrates, which are harmful to health, seep out of septic tanks, particularly after periods of heavy rainfall.

Harmful contaminants also find their way into the water supply due to poor the poor sanitation practices of a large portion of the urban population. It is believed that roughly 13 per cent – equal to 50 million urban Indians – defecate in the open. This waste finds its way into surface water and groundwater. Surveys of groundwater are finding increased levels of microbiological contamination, often caused by sewage contamination. Increased water contamination, from various sources, is contributing to urban health challenges in many Indian cities.

Urban Health Challenges in India

Poor sanitation and dilapidated water infrastructure has resulted in health challenges in urban India. The World Bank estimates that roughly 20 per cent of communicable diseases in India are related to unsafe water and hygiene practices. If the sources of the problems are not addressed it is likely that the health of urban Indians will become increasingly threatened as the population rises.

More than 100 million Indians currently live in areas with critically polluted water sources. Through an over-reliance on groundwater and a lack of official oversight, groundwater bores are dug deeper in an effort to tap into dwindling supplies. The further these boreholes are dug the more likely they are to become contaminated with dangerous levels of naturally occurring substances, such as fluoride and arsenic that leach from the bedrock. One study suggests that 66 million Indians are at risk of fluorosis and a further 500 million from health issues related to an unhealthy level of arsenic derived mainly from their water supply. Fluorosis damages teeth and bones while high levels of arsenic threatens the body’s nervous system and, in extreme cases, can cause cancer.

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1 PwC and Save the Children (2015), ‘Forgotten Voices: The World of Urban Children in India’, p. 100
As they do not have access to public services, many people that live in slums engage in practices that are harmful to their own health and that of the wider community. For example, as toilets are non-existent at the household level, and the only toilet blocks available to them are pay per use, many people living in slums have no option but to defecate in the open. Over ten per cent of urban households engage in open defecation, more than in poorer countries such as Bangladesh, Congo and Malawi.

Open defecation leads to potential health problems. Exposure to bacteria and parasites can lead to infections and other diseases. Studies suggest that children exposed to these health risks can suffer damage to their small intestines, leading to a reduction in the ability to absorb nutrients needed for growth and development. This is believed to have contributed to 61.7 million children becoming stunted in India, the highest level of any country in the world. While malnutrition has declined in India over the past decade, improving access to sanitation and putting an end to open defecation will assist in reducing it further.

The unreliable water supply, a lack of adequate sanitation facilities and unsafe hygiene practices contribute to considerable health challenges in urban India. The next part of the paper explores some solutions that could lead to better health outcomes.

Potential Solutions

Prime Minister Narendra Modi has embarked upon a campaign to build smart cities throughout India. Details about what the campaign aims to achieve remain vague. From what can be discerned, however, it would appear that the government aims to improve the core infrastructure of cities to support a higher quality of life for its citizens and ensure a clean and sustainable environment. Smart cities should, at a minimum, include an adequate water supply, an assured electricity supply and the provision of effective water and solid waste management.

Through this programme, the Indian Government has set aside the equivalent of $10.17 billion over five years to develop and retrofit urban areas. In order to receive a portion of this money governing bodies need to set out a plan articulating how they will use it to improve the infrastructure of their city. While fixing the shortcomings of water infrastructure in many cities will require time and considerable effort, programmes such as this will do much to draw attention to the problem and encourage municipal officials to come up with workable solutions.

To better maintain and expand existing water networks in Indian cities, which are clearly insufficient for the rate of urbanisation occurring in the country, a fair price needs to be applied to water and the system through which it is delivered. The implementation of a volumetric tariff would provide public utilities with the revenue to upgrade and maintain water infrastructure. Charging people for water could prove difficult as the system is already under strain and is underperforming. Furthermore, many Indians pay exorbitant prices to the water mafia and could resist increases to municipal water supply rates.

The 2012 National Water Policy states that water is a community resource held by the state. Logically then, private suppliers of water should not be allowed to operate without the say so of the Indian Government. Under this policy there are grounds to regulate the water mafia and control its activities. Co-opting private water distributors, by making them agents of the state, could provide municipalities with a revenue stream that could be channelled into improving water infrastructure. Under such a system the water that is privately distributed could be tested and treated and any potential health issues would be avoided.
Such an approach is likely to be met with resistance, however, as private operators are unlikely to agree to sharing their profits with the government. Previous efforts to regulate private water distributors have failed, as corrupt city officials allow it to continue.

In terms of ensuring the future water security of urban areas ways need to be found to preserve existing sources of water. Rather than finding new ways of exploiting shrinking reserves, urban centres need to recognise that current levels of water use are unsustainable and groundwater sources require replenishment. Urban rainwater harvesting, for instance, remains an underutilised means of recharging aquifers.

In October 2014, Modi launched the Swachh Bharat (Clean India) campaign. This programme aims to improve the level of sanitation throughout the country by 2019, chiefly by putting an end to the practice of open defecation by building more toilets. There is a potential flaw in this plan, however, as surveys have found that even when access to toilets increases many Indians choose not to use them. Changing cultural habits is, therefore, also required. The “Laws of Manu”, a Hindu text written 2,000 years ago, encourages defecation in the open, far from home. As long as the government complements its Swachh Bharat campaign with an educational programme this potential shortcoming could be avoided.

Conclusion

There are no easy solutions to the water and health challenges faced by urban India. Solving sanitation problems will require fixing water infrastructure that makes many water supplies unreliable. Such an approach only deals with the structural side of the problem, however, and is not guaranteed to lead to improved health outcomes. To achieve meaningful results, efforts need to be made to encourage improved sanitation and hygiene practices. Much of this will require overcoming existing cultural practices that contradict these practices. Cultural change, in addition to structural improvements, therefore, remains necessary for any effort that addresses water and sanitation problems to be successful.

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