

A Study On Drinking Water Quality In Rural India

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Abstract

The rural population of India comprises more than 700 million people residing in about 1.42 million habitations spread over 15 diverse ecological regions. It is true that providing drinking water to such a large population is an enormous challenge. Our country is also characterised by non-uniformity in level of awareness, socio-economic development, education, poverty, practices and rituals which add to the complexity of providing water. On one hand the pressures of development is changing the distribution of water in the country, access to adequate water has been cited as the primary factor responsible for limiting development. The average availability of water is reducing steadily with the growing population and it is estimated that by 2020 India will become a water stressed nation. Groundwater is the major source of water in our country with 85% of the population dependent on it. However, awareness, surveillance, monitoring and testing, mitigation measures, availability of alternate water sources and adoption of hygienic practises continues to remain roadblocks. There is a need to promote sanitary inspection along with the community based water quality monitoring and surveillance at the grass root level as a mechanism to identify problems and to take corrective measures.

Introduction

Rural India has more than 700 million people residing in about 1.42 million habitations spread over 15 diverse ecological regions. Meeting the drinking water needs of such a large population can be a daunting task. The non-uniformity in level of awareness, socio-economic development, education, poverty, practices and rituals and water availability add to the complexity of the task. Despite an estimated total of Rs. 1,105 billion spent on providing safe drinking water since the First Five Year Plan was launched in 1951, lack of safe and secure drinking water continues to be a major hurdle and a national economic burden. Around 37.7 million Indians are affected by waterborne diseases annually, 1.5 million children are estimated to die of diarrhoea alone and 73 million working days are lost due to waterborne disease each year.

Water Resources and Utilisation

- India has 16 per cent of the world's population and four per cent of its fresh water resources.
- Estimates indicate that surface and ground water availability is around 1,869 billion cubic metres (BCM). Of this, 40 per cent is not available for use due to geological and topographical reasons
- Ninety two per cent groundwater extracted is used in the agricultural sector, five and three per cent respectively for industrial and domestic sector.
- Eight nine per cent of surface water use is for agricultural sector and two per cent and nine per cent respectively are used by the industrial and domestic sector.

While on the one hand the pressures of development are changing the distribution of water in the country, access to adequate water has been cited as the primary factor responsible for

limiting development. The average availability of water remains more or less fixed according to the natural hydrological cycle but the per capita availability reduces steadily due to an increasing population.

Rural Water Supply

The provision of clean drinking water has been given priority in the Constitution of India, with Article 47 conferring the duty of providing clean drinking water and improving public health standards to the State. Rural water supply (RWS) programmes in India can be divided into several distinct phases

1949: The Environment Hygiene Committee (1949) recommends the provision of safe water supply to cover 90 per cent of India's population in a timeframe of 40 years.

1950: The Constitution of India confers ownership of all water resources to the government, specifying it as a state subject, giving citizens the right to potable water.

1969: National Rural Drinking Water Supply programme launched with technical support from UNICEF and Rs.254.90 crore is spent during this phase, with 1.2 million bore wells being dug and 17,000 piped water supply schemes being provided.

Effluents and Industrial Waste

Another major cause for concern is the pollution of ground and surface water from increased fertilizer and pesticide use in agriculture and from industrial sources. The consumption of fertilizers shot up from 7.7 million tonnes in 1984-85 to 13.9 million tonnes in 1994-95 and that of pesticides from 24,305 tonnes in 1974 to 85,030 tonnes in 1994-95. The rise in the usage of such compounds has degraded the quality of surface water resources by causing nitrate contamination. The World Bank has estimated that the total cost of environmental damage in India amounts to US\$9.7 billion annually, or 4.5 per cent of the gross domestic product. Of this, 59 per cent results from the health impacts of water pollution. A 1995, a survey undertaken by the Central Pollution Control Board identified 22 sites in 16 states as critical for groundwater pollution due to industrial effluents. There have been instances of heavy metals like lead, cadmium, zinc and mercury being reported in groundwater in Gujarat, Andhra Pradesh, Kerala, Delhi and Haryana.

Behavioural Practices

Practices Interventions for providing safe drinking water can become ineffective in the absence of improved sanitation. In order to provide access to sufficient quantities of safe water, the provision of facilities for a sanitary disposal of excreta, and introducing sound hygiene behaviour are of utmost importance. The ways and means by which water is collected also has an impact on its quality. It is essential to have a clean surrounding around the source to prevent contamination. Open drains and disposal of solid waste near sources of water may lead to presence of ammonia and coli form bacteria in the drinking water source. Thus prevention of water contamination at source is necessary to ensure the portability of supplied water.

Cultural Practices

There are various religious practices that revolve around sources of water. Immersion of idols in surface water bodies is a prime cause of deteriorating water quality. Water bodies have been used as dumping grounds for various offerings that have degraded the portability of surface water. Defecation on boundaries of water bodies results in bacteriological contamination.

Pollution Load - Domestic and Industrial Wastes

- 90% of the sewage generated by municipal councils and over 50% of sewage discharged

- by municipal corporations goes untreated.
- The industrial sector contributes 30729.2 million cubic metres of effluent being discharged into our water bodies.
- In India, an estimated 200,000 tonnes of faecal load is generated every day due to open defecation

Water quality monitoring

In India, the financial and technical support for rural and urban water supplies are provided by the central government while the planning, designing, construction, operation and maintenance is undertaken by state government agencies. While larger cities have their own laboratories for testing water, institutional framework for water quality monitoring and data processing is inadequate in rural areas.

Service Providers

In India, the primary responsibility for providing drinking water and sanitation facilities lies with the state governments. With the 73rd and 74th Constitutional Amendments, the states have the authority to give the responsibility of local supply of water to Panchayati Raj Institutions (PRIs) and Urban Local Bodies (ULBs). The role of the Centre is to allocate funds and guide investments, encourage research, develop human resources through training and other capacity-building efforts, promote water quality monitoring, provide guidelines for various programmes and ensure the implementation of the water supply programmes.

Health and Economic Burden

Poor water quality spreads disease, causes death and hampers socio-economic progress. Around five million people die due to waterborne diseases. In addition, these diseases affect education and result in loss of work days, estimated at 180 million person days annually. The annual economic loss is estimated at Rs.112 crores. Water-related diseases put an economic burden on both the household and the nation's economy. At household levels, the economic loss includes cost of treatment and wage loss during sickness. Loss of working days affects national productivity. On the other hand, the government spends a lot of money and time on treatment of the sick and providing other supportive services.

Expenditure on Health

According to Government of India estimates, expenditure on health adds up to Rs.6,700 crore annually (approximately Rs.60 per head per year). The WHO recommends that 5 per cent of a nation's GDP be earmarked for investments in the health sector. However, public health expenditure in India has declined from 1.3 per cent of its GDP in 1990 to 0.9 per cent of its GDP in 1999. The National Rural Health Mission of the Government of India has set the target of rising public spending on health from 0.9 per cent of its GDP to 2-3 per cent of its GDP. In India, 60-80 per cent of the resources in the health system is spent on hospital care, leaving a much lower proportion for basic services. In addition, the focus is on urban-curative services, leaving rural areas more vulnerable.

As per estimates, the average expenditure of rural households on health services amounts to 5.28 per cent of their average annual income. This percentage can vary with population in different income groups but the important message that can be derived from these facts is that our rural households are forced to spend a significant amount of their earnings on health.

Water Quality and the Poor

There are other poverty-related factors behind inequalities in child mortality, including poor nutrition and access to affordable healthcare. But increased exposure to the risk of waterborne infections is a major causal link. Children who are malnourished are more likely to suffer from diarrhea and sickness episodes last longer. Repeated incidences of diarrhea result in weight loss, stunted growth and vitamin deficiency, with greater chances of dropping out from school, leading to reduced earning power and poverty.

Dual Water Supply and Waste Water Treatment

To reduce the burden on fresh water sources, the option of dual water system is being worked out in several parts of the country. The success of this system lies in the fact that filtered purified water is used only for drinking purposes while other source of water may be used for purposes other than drinking. This is also a cost saving measure as resources spent on providing clean water is saved by using alternate sources. Waste water treatment can also be another effective means of reducing the burden on freshwater sources. The treated waste water can be used for purposes other than drinking. One example of effective wastewater treatment is in Mehsana district of Gujarat where wastewater from homes in villages is used for agriculture. The wastewater coming out of homes is collected in a pond which is then auctioned to farmers for use in agriculture. The subsequent boxes depict the use of dual water supply in Gujarat and Madhya Pradesh.

Revival of Traditional Water Conservation Structures

Traditional water conservation structures like tanks, lakes, ponds have been in use in India since ages. These served as sources of water for people by capturing rainfall and surface runoff. However in the past few decades one has seen many of these structures becoming dysfunctional. The usefulness of these structures still holds good and there has been initiatives across the country for revival of such systems. These structures are a good source of water and have proved useful in dry arid regions of the country.

Reviving Ooranis in Tamil Nadu

Villagers in Ramanathapuram district of Tamil Nadu have worked on reviving traditional ponds or “ooranis” to deliver water to villages. These ponds collect surface runoff and sub-surface freshwater at places. To rejuvenate “ooranis”, Vivekananda Kendra, a Non- Government Organisations (NGOs) in Kanyakumari began close interaction with local communities. The villagers participated in desolation exercise and the storage capacities were increased by widening the riverbeds. Recharge tube wells were provided to augment the water supply. People were trained on maintaining the ponds and this successful initiative have resulted in providing water to the people of the area.

Conclusion

In India, investments in community water supply and sanitation projects have increased steadily from the 1st plan to the 10th plan. However, the health benefits in terms of reduction in water-borne disease have not been commensurate with the investments made. Though health sector is bearing the burden of water and sanitation related infectious diseases, presently it does not have adequate institution or expertise for monitoring and surveillance of community water supply programmes in the country. However, awareness, surveillance, monitoring and testing, mitigation measures, availability of alternate water sources and adoption of hygienic practises continues to remain roadblocks. There is a need to promote sanitary inspection along with the

community based water quality monitoring and surveillance at the grass root level as a mechanism to identify problems and to take corrective measures.

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