

A Study on Drinking Water Quality in Rural India

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Abstract

India had witnessed significant improvement in rural water supply with increasing coverage of areas and a large volume of financial resources made available. A series of schemes were aimed at improving the supply of drinking water for rural habitations and now for monitoring and ensuring quality. The past few years have seen greater emphasis on water quality monitoring and surveillance with specific allocation being made under Central grants. There had been great focus on setting up and upgrading laboratories at the state and district levels, and on water monitoring through field testing kits. Water and sanitation programmes have operated largely in isolation from programmes in health and education. A wider approach was needed where water and sanitation issues are looked at with the aim of reducing disease, improving hygiene, improving educational levels and reducing poverty. There can be little doubt that water was a basic necessity for the survival of humans. There was interplay of various factors that govern access and utilisation of water resources and in light of the increasing demand for water it becomes important to look for holistic and people-centred approaches for water management.

Keywords: Drinking water, quality, basic necessity, educational level, poverty,

Introduction

The rural population of India comprises more than 700 million people residing in about 1.42million habitations spread over 15 diverse ecological regions. It was true that providing drinking water to such a large population is an enormous challenge. Our country was 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. 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. The government has undertaken various programmes since independence to provide safe drinking water to the rural masses. Till the 12th plan, an estimated total of Rs.1,501 billion spent on providing safe drinking water. One would argue that the expenditure is huge but it is also true that despite such expenditure lack of safe and secure drinking water continues to be a major hurdle and a national economic burden.

Drinking Water Quality

Water quality is affected by both point and non-point sources of pollution. These include sewage discharge, discharge from industries, run-off from agricultural fields and urban run-off. Water quality is also affected by floods and droughts and can also arise from lack of awareness and education among users. The need for user involvement in maintaining water quality and looking other aspects like hygiene, environment sanitation, storage and disposal are critical elements to maintain the quality of water resources. Water quality monitoring is now being considered an important part of the government programme. Since 2000, water quality monitoring had been accorded a high priority and institutional mechanisms have been developed at national, state, district, block and panchayat levels.

The government has also outlined requisite mechanisms to monitor the quality of drinking water and devise effective Information, Education and Communication (IEC) interventions to disseminate information and educate people on health and hygiene.

Ground Water Contamination & Its Impact in India

Ground water was generally less susceptible to contamination and pollution as compared to surface water. About 85 % of rural population in India was solely depended on ground water, which is depleting at a fast rate. In India, where groundwater is used intensively for irrigation and industrial purposes, a variety of land and water-based human activities are causing pollution of this precious resource. The main sources of drinking water in different states of India comparing status as on 2001 and 2011

Review of Literature

James Wescoat *et al* (2016) in their article viewed that the national drinking water programs seek to address monitoring challenges that include self-reporting, data sampling, data consistency and quality, and sufficient frequency to assess the sustainability of water systems. India stands out for its comprehensive rural water database known as Integrated Management Information System (IMIS), which conducts annual monitoring of drinking water coverage, water quality, and related program components from the habitation level to the district, state, and national levels. The objective of this paper is to evaluate IMIS as a national rural water supply monitoring platform. This is important because IMIS is the official government database for rural water in India, and it is used to allocate resources and track the results of government policies. After putting India's IMIS database in an international context, the paper describes its detailed structure and content. It then illustrates the geographic patterns of water supply and water quality that IMIS can present, as well as data analysis issues that were identified. In particular, the fifth section of the paper identifies limitations on the use of state-level data for explanatory regression analysis. These limitations lead to recommendations for improving data analysis to support national rural water monitoring and evaluation, along with strategic approaches to data quality assurance, data access, and database functionality.

Srikanth (2009) in his study entitled "Challenges of sustainable water quality management in rural India" attempted on analysis of the high rates of mortality and morbidity due to water-borne diseases are well known in India. Serious degradation of water quality in urban India had often been attributed to indiscriminate disposal of sewage and industrial effluents into surface water bodies. The population in rural India was mainly dependent on the groundwater as a source of drinking water. As a quality concern the groundwater was often found to be contaminated with fluoride, arsenic, iron and salts. In recent years, fluorosis had emerged as major public health issue in rural India. At the technical level, some progress has been made in the development and use of field-level diagnostic kits. Decentralization of health-related monitoring at the villages needs to be institutionalized and this requires capacity development at all levels. This article discusses the various components that impact effective water quality management in rural India. Experience suggests that redesigning of data management programme at village, district and at national level, up gradation of district-level laboratories and addressing technical, legal and institutional components should become the first steps in achieving effective water-quality management and providing better health to millions of people living in rural India.

Srikanth(2009) in his study title on "Challenges of sustainable water quality management in rural India" and concluded that the Water quality monitoring and management model for India needs to be quite different than that of the West. Institutional change that advocates decentralized monitoring and intervention at community level offers cost savings and community involvement in the process. Integration of water quality, sanitation and hygiene with positive outcome of intervention process was vital in bridging the existing gap. Community participation in operation and maintenance of the water treatment structure is vital in addressing the gaps in the sector. Research and review of national drinking standards taking into consideration the local condition, especially with regard to critical parameters like fluoride and arsenic was vital for preserving public health. Citizen action groups and civil societies should be increasingly engaged in making the government accountable in enforcing regulation with regard to industrial effluent and sewage treatment

plant for preventing surface and groundwater contamination. Outsourcing water quality data management and sample collection and monitoring could be an alternative mechanism that can be explored, which would ease the burden on the state and bring better efficiency and sustainability. More scientific debate on privatization of water quality management in India needs to be considered.

Objective of the Study

1. A Study on Drinking Water Quality in Rural India

Methodology

Secondary data was collected from books, journals, published articles and reports, magazines and also most from the internet sources, www.google.com, www.yahoo.com, Economic Survey of India.

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.
- Around 4,000 BCM of fresh water is available due to precipitation in the form of rain and snow, most of which returns to the seas via rivers.
- About 92% groundwater extracted is used in the agricultural sector, 5 and 3 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.

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.

Priority and Programmes

- The Government of India launched the National Rural Drinking Water Quality Monitoring and Surveillance Programme in February 2006. This envisages institutionalisation of community participation for monitoring and surveillance of drinking water sources at the grassroots level by gram panchayats and Village Water and Sanitation Committees, followed by checking the positively tested samples at the district and state level laboratories.
- From 2006-07 onwards, the states have been directed to earmark up to 20 per cent of Accelerated Rural Water Supply Programme (ARWSP) funds for tackling water quality problems.
- With the aim of setting up laboratories, the Government of India has sanctioned 430 district level laboratories out of which 252 have been established till 2005. Various state governments and other organisations have also established 158 laboratories.
- The Government of India has made an allocation of Rs.1,565 crore for the current financial year (2011-12), to states and Union Territories for tackling water quality problems due to excessive fluoride, nitrate, arsenic, iron and salinity.

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 workdays, 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 and Health

According to Government of India estimates, expenditure on health adds up to Rs.6,700 crore annually. 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% 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, 60-80per 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 5.28per cent of their average annual income¹⁷ 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 diarrhoea and sickness episodes last longer. Repeated incidences of diarrhoea result in weight loss, stunted growth and vitamin deficiency, with greater chances of dropping out from school, leading to reduced earning power and poverty. However supplying clean water alone would not solve health-related problems. Only an integrated approach of water quality improvement with improvement in water availability combined with sanitation and hygiene education will help address this issue.

Towards Cleaner Water

Providing safe drinking water to all in rural India is a challenging task. Given the diversity of the country and its people, solutions have to be diverse. One has to look at an approach that seeks the participation of users through interventions engaging the communities with various government schemes and policies. Citizens should be made aware of the demand for clean drinking water as a right. Such an integrated approach would incorporate collaborative efforts of various sectors involving the government, civil society and needless to say the people.

Role of Government

Supportive and drives: One of the major challenges is to make people aware on the need to consume safe water. There are examples where despite being provided potable water by the government, people drink water from contaminates surface sources. The government needs to support civil society and organisations involved in increasing awareness. An integrated campaign can result in wide spread information dissemination amongst the masses on the ways and means of preventing contamination of water sources.

Testing and remedial action: There is an urgent need to enhance the monitoring network by establishing monitoring stations across all regions and seasonal assessments of all water sources. In case of contamination being detected, an action plan for dealing with sources should be provided. The challenge lies in establishing well-equipped laboratories with well-trained staff. This also calls for training of people and infrastructure development. Although there has been wide usage of field testing kits, they often give false or semi-quantitative

results. One can rely on field testing kits for a broader picture, but laboratory tests are domain. The data in respected of water quality affected habitations is available in the website of DDWS but many of the state water and sanitation departments do not have such data. Generating data, its interpretation and communication is essential for effective management of water and the use of Geographical Information System (GIS) can assist in mapping, modelling and decision-making.

Capacity and Building Programmes: The roles of Panchayats are becoming more important and stress is being laid on community-based approaches in dealing with water-related problems. A prerequisite for increasing community participation is training of people from the communities so that they are able to make well-informed decisions. The objectives of decentralisation can come about only if there is an attitudinal change among government functionaries as well as the people, with respect to decentralisation, transferring authority and responsibility to the people at the community level. The role of the government in implementing capacity building programmes is essential.

Inter-agency coordination: One major bottleneck in an effective policy formulation and implementation has been the current institutional set-up involving various government agencies. There is a fragmented approach at the state and central level with the involvement of numerous agencies in the supply and management of water. Better co-ordination amongst ministries and departments would ensure effective implementation accountable.

Conclusion

In India, investments in community water supply and sanitation projects have increased steadily from the First Five Year Plan to 12th plan. However, the health benefits in terms of reduction in waterborne 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. India has witnessed significant improvement in rural water supply with increasing coverage of areas and a large volume of financial resources made available. A series of schemes are aimed at improving the supply of drinking water for rural habitations and now for monitoring and ensuring quality. The past few years have seen greater emphasis on water quality monitoring and surveillance with specific allocation being made under Central grants. There has been great focus on setting up and upgrading laboratories at the state and district levels, and on water monitoring through field testing kits.

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. One of the greatest challenges has been the convergence of various departments associated with water. Water and sanitation programmes have operated largely in isolation from programmes in health and education. A wider approach is needed where water and sanitation issues are looked at with the aim of reducing disease, improving hygiene, improving educational levels and reducing poverty. There can be little doubt that water is a basic necessity for the survival of humans. There is interplay of various factors that govern access and utilisation of water resources and in light of the increasing demand for water it becomes important to look for holistic and people-centred approaches for water management.

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