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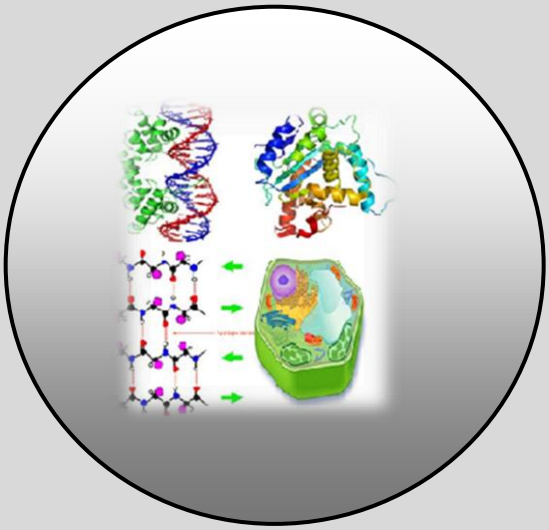

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REVIEW ARTICLE

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Water Quality Scenario in India

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ABSTRACT

Water, the finite and fragile resource, has become the most abused and grossly mismanaged natural resource in the country. Over the years, the country has been facing recurring problems in plenty in the form of devastating floods in the eastern and north eastern parts and also acute scarcity in many parts especially in the hard rock region with limited water potential and covering two third of geographical area of the country. Added to this is the major problem of degradation of water quality of both surface and ground water.
Key Words : Arsenic, Flouride, Iron and Water quality.

INTRODUCTION

In developing country like India, the problems of water quality are associated with microbiological contamination due to inadequate sanitation. Water borne diseases caused by the consumption of contaminated water continue to take heavy toll of human lives every year (EPA, 1993). Besides water pollution is increasing due to indiscriminate disposal of untreated effluents from industrial, domestic and agriculture sources. Bulk of the water supply in our country is ground water based (more than 85%), developed through hand pump installed spot sources and piped water supply schemes based on energized deep tube wells. Generally, ground water being an underground system, is less susceptible to pollution as compared to surface water. However, ground water quality is getting increasingly polluted and sustainability of water quality has become a major concern. Water quality monitoring and pollution prevention is normally carried out by the Public Health Department only during outbreaks of epidemics. There is no National or State Legislation for regular water quality surveillance, monitoring and testing (Varshney, 1991).

Rural Water Supply in India is possibly the largest of its kind in the world, involving substantial investments of more than 40,000 crores, rural water supply is given highest priority by government of India and an exclusive department was created for realizing the objective of cent per cent coverage of safe water to all habitants of the country. It is a fact that significant progress has been achieved in the rural water supply sector to sustained efforts by the Governments, both at the Centre and the States. In this regard, some of the major achievements that are worth mentioning in the sector include

i. Impressive coverage of about 86% fully covered and 12% Partially covered habitations with safe drinking water through 3.5 millions hand pumps and 1.16 lakhs piped water supply schemes
ii. Focused attention for water quality issues of chemical origin like excess Fluoride, Iron, Arsenic, Nitrate and Brackishness
iii. Imitative for testing of the drinking water quality in the country by suitably strengthening the district level labs of the state
iv. Cent percent eradication of guinea worm, one of the major bacteriological problems, from the country in collaborations with the Ministry of Health and Family Welfare, WHO, UNICEF and other agencies
v. Initiation of integrated approach in the rural water supply sectors by introducing components of HRD and Information, Education and Communication designed to increase the overall knowledge based and awareness relating to problems and prospects in Rural water Supply
vi. Introduction of Sector Reforms in Rural water supply sector through identified pilot projects with the main objectives of institutionalizing a community based rural water supply system with a "demand responsive approach" in which the community will themselves plan, implement, manage, own operate and maintain water supply schemes in their area.

It is a common knowledge that ground water pollution is generally two types:

a) Contaminations caused by the very nature of the geological formation: excess fluoride, arsenic, iron and salinity fall under this category

b) Ground water pollution caused by human interferences. Some the examples are

i. Excess application of chemical fertilizers having high quantity of Nitrates used in Agricultural sector
ii. Biological contamination due to discharge of untreated domestic sewage
iii. Discharge of untreated industrial effluents
iv. Excess pumping of ground water in coastal areas leading to brackishness
v. Water logging and soil salinity in canal command areas due to unilateral and isolated development of surface water, causing water table to rise.

Apart from the above, excess pumping of ground water from a large number of tube wells in Arsenic affected areas in West Bengal is attributed as one of the reasons for the Arsenic problem (NEERI, 1973). It is a matter of serious concern that the quality problems of fluorides

and arsenic contaminations have come to the forefront, affecting a large segment of the population. A variety of disease have emerged including dental and skeletal Flourosis (caused by excess fluoride) and arsenic dermatosis and skin cancer (due to excess arsenic), besides the less serious stomach problems (due to excess iron and brackishness). The reported population directly affected and at risk in case of fluoride and arsenic problem in rural areas is estimated at 25 and 71 million respectively (Krishna Murti and Vishwanathan, 1991).

Out of 15.23 lakhs habitations in the country, nearly, 2,18,000 habitations are reportedly by different quality problems of chemical origin like excess fluoride, arsenic, iron, nitrate and salinity. The quality affected habitations roughly comes to 15% of the total habitations. Four States (Arunachal Pradesh, Himachal Pradesh, Goa and Uttrakhand and four union territories have indicated absence of any quality problem. At the same time recent survey undertaken by States based on stratified sampling blocks wise indicates a general increase in number of quality affected habitations in the States of Rajasthan, Tamil Nadu, West Bengal, Punjab, Haryana, UP and MP(Bhargava, 1997).

Rajiv Gandhi National Drinking Water Mission entrusted with the responsibility of providing safe drinking water to rural population has been focusing its attention on the quality issues since 1986. The measures included installations of spot resources in problem zone, alternate water supply, tapping of surface water, installations of quality problem removal units and supply of domestic water filters.

Water Quality Problems

Salient features of some of the major quality problems of chemical origin in water supply are highlighted below

Flouride

High fluoride concentrations, in ground water beyond the permissible limit of 1.5ppm has been a major toxicological and geo-environmental problem in India. Flourosis poses a serious health hazard affecting 25 million rural population spread over more than 200 districts in 17 States. The overall range of concentrations of fluoride varies from 1.5 to 29 ppm. Its effect is severe amongst young and old. Skeletal and dental flourosis at advanced stages is irreversible. On the basis of intensity and spread of flourosis incidence, affected starts are classified into 3 broad categories

a. Kerala, J&K, W B, Orissa, Assam, Bihar and Delhi with less than 30 per cent of the districts affected

b. Punjab, Haryana, MP, Karnataka, UP ,TN, Chattisgarh and Maharashtra with 30 – 70% of the districts affected

c. Rajasthan, Gujarat and AP with 70 – 100% of districts affected

Arsenic

Arsenic contamination in ground water, exceeding the permissible limits of 0.05 mg/l (Valko, *et. al*., 2005) in parts of West Bengal has been found as a major quality problem and health hazards affecting a substantial rural population in 4000 habitants in 67 blocks of 8 districts (Singh *et.al*., 2007). Population at risk is estimated at 5.3 million, while population showing

arsenic related skin manifestations is estimated to be 2 lakhs. It may be mentioned that North 24 Pargana district has the maximum number of affected blocks. It is reported that 37% of estimated population at risk belong to North 24 Pargana.

Iron

Excess iron is also an inherent quality problem in ground water and is prevalent mostly in hill regions and in North Eastern part of the country. It is not as injurious to health as compared to the excess arsenic and fluoride. Excess iron in drinking water beyond the permissible limit of 1 ppm causes digestive disorders. A total of 1,38,690 habitations spread over 16 states in the country are found to be affected with iron contaminations.

Nitrate

Nitrate contaminations caused by the discharge of domestic sewage and applications of chemical fertilizers is also emerging as a major problem in the States of TN, Rajasthan, Gujarat, Karnataka, Maharashtra and UP.

Brackishness

Brackishness in drinking water causes laxative effects. As many as 34480 habitations in States are found to be affected with Brackishness and salinity problems. This covers coastal salinity and inland salinity areas. The control measures include supply of water TDS less than 1500 ppm through treatment of contaminated water distillations or membrane technology, ION exchanger or solvent extraction etc.

Eradication of Guinea worm (Dracunculiasis)

Guinea worm is a parasitic disease which spreads through drinking water. The strategies adopted by the Mission to eradicate guinea worm include house to house search operations, maintaining surveillance, timely management of patients by medical aid, identifications and mapping of unsafe drinking water sources, provision and maintenance of safe drinking water, health education to community etc.

However, it may be mentioned that water borne diseases associated with high morbidity and mortality rate continue to pose a challenge to human beings. Hence, testing of sources for biological contaminations (fecal coliform and *E. coli*) should be an integral component of water quality surveillance (Lambert, *et.al.* 2000).

Grass root level educational and technical institutions should be used to utilize their existing resources and should be provided financial assistance for strengthening laboratory facilities. Further, it is envisaged to have institutional mechanism backed by adequate infrastructure in the form of trained personnel and equipment to have appropriate village, block, district and State level laboratories with specific responsibilities. The emphasis is therefore on establishing a network of connected institutions, aiming at closer interaction, rapport and partnership between the agency and community, thus help transforming the role of Government from provider of services to facilitator.

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