Drinking Water Quality in Rural Area and Healthy Society in India

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Abstract
Provision of safe drinking water is a basic necessity. Rural drinking water supply is a State subject and has been included in the Eleventh Schedule of the Constitution of India, among the subjects that may be entrusted to Panchayats by the States. To accelerate the pace of coverage of problem villages with respect to provision of drinking water, the Government of India introduced the Accelerated Rural Water Supply Programme (ARWSP) in 1972–73, to support States and UTs with financial and technical assistance in implementing drinking water supply schemes in such villages. If we look at the present scenario, we are leading towards crisis. About 85% of rural population in India is solely depended on ground water, which is depleting at a fast rate. In the urban area though about 60% of the population is depended on surface water sources, the availability and quality are questionable. This paper analyses the importance of quality drinking water and healthy society in India.

Keywords
Quality Drinking Water, Water Resources and Utilization, Rural water supply, Benefits of drinking water, Healthy Society

I. Introduction

Clean, safe and adequate fresh water is vital to the survival of all living organisms and the smooth functioning of ecosystems, communities and economies. Declining water quality has become a global issue of concern as human populations grow, industrial and agricultural activities expand, and climate change threatens to cause major alternations to the hydrological circle. Water quality issues are complex and diverse, and are deserving of urgent global attention and action. Water quality monitoring is now being considered an important part of the government Programme. Since 2000, water quality monitoring has 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.

II. Objectives

With an aim to have regular testing and monitoring of water quality status in rural areas, Water Quality Monitoring and Surveillance programme was launched with the following main objectives. The programme focuses on community involvement with required support by the Government and it has helped to take possible remedial measures so as to provide safe water to the community.

- Monitoring and surveillance of all drinking water sources in the State by the community.
- Decentralization of water quality monitoring and surveillance of all rural drinking water sources in the State.
- Institutionalization of community participation and involvement of PRIs for water quality monitoring and surveillance.
- Generation of awareness among the rural masses about the water quality issues and the problems related to water borne diseases.
- Building capacity of Panchayats to own the field test kits and take up full O&M responsibility for water quality monitoring of all drinking water sources in their respective PRI area.

Quantity as well as quality with the following approaches and reforms;

- Paradigm shift from ground water to surface water.
- Water supply to scarcity and water quality affected areas through Statewide Water Supply Grid and as a last resort, when other options are not available, adopting technology like RO system.
- Focus on Infrastructure creation for service delivery of treated quality surface water in villages.
- Strengthening of local water sources through recharge.

III. Water Quality

Government has made significant interventions to improve the quality of drinking water in rural areas. Until recently, activities relating to water quality were limited to testing of water sources at the time of commissioning the PWS Projects and provision of alternative water supply for areas where occurrence of Fluoride, salinity and Iron in ground water is beyond the permissible limit. To ensure quality testing, field test kits (FTKs) have been provided and testing is being conducted at grass root level to assess the

quality of drinking water.

The Action Points are;

- Monitoring and surveillance of water quality with appropriate institutional framework.
- Integration of community water supply projects with hygiene education and sanitation.
- Participation of the users in water quality monitoring and surveillance and developing necessary competencies for participation from within the community.
- Dissemination of technological solution to tackle water quality problems.

IV. 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. For example 2007: Pattern of funding under the Swajaldhara Scheme changes from the previous 90:10 Central-community share to 50:50 centre-state shares. Community contribution is now optional. The approach paper for the 11th Five Year Plan calls for a comprehensive approach which encompasses individual health care, public health, sanitation, clean drinking water, access to food and knowledge about hygiene and feeding practice. It also states the need to upscale more schemes related to community management of water reducing the maintenance burden and responsibility of the state. It is envisaged to provide clean drinking water for all by 2009 and ensure that there are no slip-backs by the end of the 11th Plan.

V. Water Resources and Utilisation

1. India has 16 per cent of the world's population and four per cent of its fresh water Resources.
2. 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.
3. 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.
4. Ninety two per cent groundwater extracted is used in the agricultural sector, five and three per cent respectively for industrial and domestic sector.
5. 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.
6. In 1955, the per capita availability was 5,300 cubic metres (cu.m) per person per year, which came down to 2,200 cu. m in 1996.
7. It is expected that by around 2020, India will be a 'water stressed' state with per capita availability declining to 1600 cu m/person/year. A country is said to be water stressed when the per capita availability of water drops below 1700 cu. m/ person/year.

VI. Water Quality Monitoring and Surveillance

In order to develop understanding and appreciation of safe and clean drinking water among rural communities and to enable them to determine the quality of drinking water, National Rural Drinking Water Quality Monitoring and Surveillance Programme was launched in February 2006. The programme aimed at empowering rural communities by; i) Bringing awareness through Information, Education & Communication (IEC) activities to address health hazards due to poor drinking water quality, hygiene, sanitary survey, importance of environmental sanitation, etc. ii) Training 5 villagers/workers in each Gram Panchayat for testing drinking water sources. iii) In addition to 5 Gram Panchayat workers, 2 persons at the State level, 4 persons at the district and 5 persons at the Block level are also to be trained in water testing. Under this programme, Filed testing kits are provided to each Gram Panchayat was made. 100% financial assistance was provided to the states for this task. With effect from 1.4.2009, the Water quality monitoring and surveillance programme has been subsumed under the NRDWP and these activities are now supported from the Support fund.




VII. States Affected By Various Water Quality Problems;

PARAMETE-R	MAXIMUM PERMISSI-BLE LIMIT	HEALTH IMPACT	AFFECTED STATES
FLUORIDE	1.5 mg/ l	1).Immediate symptoms include digestive disorders, skin diseases, dental fluorosis 2). Fluoride in larger quantities (20-80 mg/ day) taken over a period of 10-20 years results in crippling and skeletal fluorosis which is severe bone damage	Andhra Pradesh, Assam, Bihar, Chattisgarh, Gujarat, Haryana, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal
ARSENIC	0.05 mg/l	1) Immediate symptoms of acute poisoning typically include vomiting, oesophageal and abdominal pain, and Bloody 'rice water' diarrhoea. 2). Long-term exposure to arsenic causes cancer of the skin, lungs, urinary bladder, and kidney. There can also be skin changes such as lesions, pigmentation changes and thickening (hyperkeratosis)	Assam, Bihar, Chattisgarh, Jharkhand, Tripura, West Bengal, Uttar Pradesh
IRON	1 mg/ l	1).A dose of 1500 mg/l has a poisoning effect on a child as it can damage blood tissues 2). Digestive disorders, skin diseases and dental problems	Arunachal Pradesh, Assam, Bihar, Chattisgarh, Jharkhand, Jammu and Kashmir, Karnataka, Kerala, Manipur, Meghalaya, Mizoram, Madhya Pradesh, Maharashtra, Nagaland, Orissa, Punjab, Rajasthan, Sikkim, Tripura, Tamil Nadu, Uttar Pradesh, West Bengal, A&N Islands, Pondicherry

NITRATE	100mg/ l	Causes Methamoglobinemia (Blue Baby disease) where the skin of infants becomes blue due to decreased efficiency of hemoglobin to combine with oxygen. It may also increase risk of cancer.	Bihar, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh
SALINITY	2000 mg/l	1). Objectionable taste to water. 2).May affect osmotic flow and movement of fluids	Andhra Pradesh, Chattisgarh, Gujarat, Haryana, Kerala, Madhya Pradesh, Maharashtra Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal, Pondicherry
HEAVY METALS	Cadmium – 0.01 mg/l Zinc – 15 mg/ l Mercury – .001 mg/l	Damage to nervous system, kidney, and other metabolic disruptions	Gujarat, Andhra Pradesh, Delhi, Haryana, Kerala
PERSISTENT ORGANIC POLLUTANTS	None	High blood pressure, hormonal dysfunction, and growth retardation.	Delhi, Himachal Pradesh, Jharkhand, West Bengal,
PESTICIDES	Absent	Weakened immunity, abnormal multiplication of cells leading to tumour formation They contain chlorides that cause reproductive and Endocrinal damage.	

Source: Drinking water quality in rural India: Issues and approaches - Indira Khurana & Romit Sen, waterAid

BEHAVIOURAL 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 behavior 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.

VIII. Benefits of Drinking Water

Drinking an adequate amount of water daily is important for overall good health because water aids in digestion, circulation, absorption and even excretion. Our bodies are around 60% water, give or take. It is commonly recommended to drink eight 8-ounce glasses of water per day (the 8×8 rule). Although there is little science behind this specific rule, staying hydrated is important.

1. Increases Energy & Relieves Fatigue; Since your brain is mostly water, drinking it helps you think, focus and concentrate better and be more alert. As an added bonus, your energy levels are also boosted.
2. Promotes Weight Loss; Removes by-products of fat, reduces eating intake (by filling up your tummy if consumed prior to meals), reduces hunger (hello natural appetite suppressant!), raises your metabolism and has zero calories.
3. Flushes out Toxins; Gets rid of waste through sweat and urination which reduces the risk of kidney stones and UTI's (urinary tract infections).
4. Improves Skin Complexion; Moisturizes your skin, keeps it fresh, soft, glowing and smooth. Gets rid of wrinkles. It's the best anti-aging treatment around.
5. Maintains Regularity; Aids in digestion as water is essential to digest your food and prevents constipation.
6. Boosts Immune System; A water guzzler is less likely to get sick. And who wouldn't rather feel healthy the majority of the time? Drinking plenty of water helps fight against flu, cancer and other ailments like heart attacks.
7. Natural Headache Remedy; Helps relieve and prevent headaches (migraines & back pains too!) which are commonly caused by dehydration.
8. Prevents Cramps & Sprains; Proper hydration helps keep joints lubricated and muscles more elastic so joint pain is less likely.
9. Puts You In A Good Mood; When the body is functioning at its best, you will feel great and be happy.
10. Save Money; Water is free Even if you choose bottled/filtered water, it's still cheaper than that high sugar and fat-filled latte.

IX. Conclusion

On the basis above context we can express that the water is a basic necessity for the survival of humans. There is interplay of various factors that govern access and utilization 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. 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 practices 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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