



## ENSURING CLEAN DRINKING WATER; APPROACHES AND STRATEGIES

RAHUL MISHRA\*, DHIRAJ KUMAR, NISHANT KUMAR SINHA, JITENDRA KUMAR, DINESH KUMAR YADAV, J K SAHA

ICAR-Indian Institute of Soil Science, Bhopal, Madhya Pradesh

\*Corresponding author, E-mail: mishrarahul471@gmail.com



**T**he provision of safe and adequate clean water readily available to the public is necessary for ensuring public health, whether; the water is consumed for drinking, irrigation, house hold purpose, recreational purpose and even as an input for factories. The United Nations commitment for ensuring “Leaving No one Behind” is one of the crucial points in the 2030 Agenda for Sustainable Development Goals (SDGs) (United Nations Report, 2018). The 6<sup>th</sup> Goal of SDGs 2015-30 is meant for clean water and sanitation, of which Goal 6.1 says specifically that by 2030 including countries like India; we should achieve the target of universal and equitable access to safe and also affordable supply of drinking water considered for all. Even, Article 47 of the Indian Constitution prescribed the said duty of providing clean drinking water as well as improving the public health standards to the State.

As per the United Nations report on safe drinking water, around 2.2 billion people are surviving without access to safe drinking water at home and around 80% of those who stays in rural areas use water from unprotected and unsafe sources. As per reports, around 700 million people could become displaced by 2030 due to intense water crisis. Water consumption of the world is doubling every 20 years. The recent estimates by (Jaramillo and Destuoni, 2015) suggest the freshwater withdrawals had already surpassed the planetary boundaries by more than 10%. India is one among the most water scarce countries of the world, from 1951 to 2010, our population just tripled and the per capita water availability declined from 5,177 m<sup>3</sup> per year in 1951 to 1,588 m<sup>3</sup> per year in 2010. Mainly our water resources are not evenly distributed, even the rainfall distribution is very uneven, with sudden



downpour at some pockets and completely dry belts at other. The conservation of water should be done religiously to overcome the crisis.

### **DRINKING WATER AND ENVIRONMENTAL SUSTAINABILITY**

Safe drinking water considered as a matter of main agenda item under Sustainable Development Goals (SDGs) of the United Nations (UN). In spite of its importance at several forums, still the access to safe and secure drinking water is lacking. The government agencies are trying to provide safe and adequate drinking water to all the inhabitants through several schemes, but both supply and demand side factors determine the availability of water. The supply side includes the water at surface, subsurface flows, water bodies, underground water, recharge, quality of water, institutions, maintenance, operations etc. While on the demand side, population pressure, industrial discharge, waste water, pollution through excess fertilisers, heavy metal, water pricing etc. contribute rapidly towards deterioration of water quality.

The water contamination is happening either at the source or during the delivery is due to both man made and environmental or inappropriate monitoring systems. The geological and geographical factors leads to contamination of water through fluoride, arsenic, lead, nitrate etc. and the human interventions causes water quality deterioration through industrial effluents, washing of animals, clothes, plastics, defecation, air pollution, oil spills etc. that together make the water totally unsafe for use. Sometimes diffuse sources like excess fertiliser application in nearby agricultural fields making nutrients loads into the water bodies causing algal blooms that in turn reduce oxygen level in water and create dead zones for all forms of aquatic life. Further, the chemical and heavy metals release from industrial and municipal bodies also deteriorate the water quality.

### **WATER AND HEALTH**

The relationship between water usage and health is complementary. The contaminated or poor quality water is one of the major sources of illness. As per an estimate unsafe water sickens around 1 billion people around the planet annually. Mostly the lower income

groups and countries are most vulnerable or at higher level of risk because of their non-access to safe drinking water and also their homes are often at close proximity to the polluting industries. India is losing 73 million working days due to water-borne diseases. Contaminated water, poor drainage, filthy water bodies are intricately linked to disease transmission like dysentery, malaria, cholera, diarrhoea, typhoid, polio, hepatitis A etc. Inappropriate, poor, inadequate management of water bodies and water sources leads to severe health risks to humans and other life forms. In health care facilities, where the sanitation, hygiene, water supply is lacking, there arises additional risk both for the patient and the health care personnel's. The horrific picture arises when, we manage our ecosystem, urban and rural working spaces, agricultural activities in an inappropriate way, then it risk the life of millions of people who directly or indirectly using the contaminated and polluted water.

The pollution of water due to nutrients load arising owing to over use of fertilisers and pesticides led to severe diseases in infants like blue baby syndrome, other life forms due to organic matter load, deficiency of oxygen etc. Approximately 8,29,000 people die annually due to diarrhoea due to unsafe and poor quality drinking water, sanitation and hygiene. Worldwide more number of children's died due to Diarrhoea alone than malaria and tuberculosis together (Rana, 2009). Thus, to ensure sound public health water quality is a critical issue. As water is very closely and intricately associated with day to day human activities, thus provision of providing safe drinking water is one of the very important public health priorities (Bain et al., 2014). Even the insects lay eggs in contaminated water and breed in water to transmit diseases like malaria, typhoid, dengue etc. Thus, by just maintaining hygiene and proper care, many of the water borne diseases could be avoided. Few ways for reducing contamination of water includes

1. Efficient disposal of non-biodegradable waste and reduced use of plastic and its recycling will reduce the load of plastics in water bodies.
2. Judicious use of fertilizers and agrochemicals
3. Climate friendly crops and efficient irrigation system could reduce the need for water.



4. Avoid direct dumping of wastes into water and treatment of waste water for their reuse
5. Planting of trees could reduce the surface runoff, cease erosion and reduce the toxic substances from leaching down to ground water
6. Installation of water efficient appliances and awareness creation for water conservation and importance of maintaining water clean

Improvement in water supply coupled with sanitation provides individuals with better comfort, safety, status, dignity and convenience and thus having greater effects on the living environment (Hutton et al., 2014). Quantification of socio-economic effects is quite difficult due to their subjective nature. Nevertheless, the benefits arising due to socio-economic changes have been repetitively considered among the most important and crucial for beneficiaries of water supply and sanitation and might be particularly relevant for women as well (Fisher, 2006). Most of the habitations from both rural and urban should be covered under adequate water supply. Priority must be given to efficient delivery and treatment of water supply. Water quality awareness camps and sensitizations groups at village levels coupled with system of water testing must be there to ensure availability of safe water.

### CHALLENGES

- ⌚ If the demand continues as per current pattern, then about half of the demand of water will be not met by 2030 (Committee on Restructuring the Central Water Commission (CWC), Central Ground Water Board (CGWB), 2016).
- ⌚ High rate of industrialization, population growth, changing cropping pattern and climate change had pose severe pressure on the water resources of our country. Wise and proper management of available water is the only way out to make sure its sufficient availability in the future.
- ⌚ The ground water usage is also very high, about 60% of our districts face groundwater over-exploitation.
- ⌚ Insufficient monitoring of ground water usage, lack of community participation, lack of non practice of traditional water harvesting structure, unplanned urban and rural development, wastage

of water, non recycling or reuse of water etc, had together, intensify the water crisis in the country.

- ⌚ Regional and temporal variation of rainfall due to climate change and associated problems such as drought, floods etc.
- ⌚ If the waste water to be used after recycling or treatment, then proper care should be taken, as its inappropriate usage may lead to numerous health hazards.

### PUBLIC POLICIES AND SUPPORT

The Government of India has been constantly trying to empower local communities for tackling the issue of water and sanitation. Some of them are

- ⌚ Bhore Committee in 1946 for Accelerated Rural Water Supply Programme (1972).
- ⌚ The Swajal Dhara scheme in 1999 by Department of Drinking Water Supply, Ministry of Rural Development.
- ⌚ Bharat Nirman as a flagship programme of the Gol to provide good quality water for the rural households of the country.
- ⌚ National Rural Drinking Water Programme (NRDWP) to assist the States in order to provide adequate and safe drinking water to the rural population in the country.
- ⌚ Jal Shakti Abhiyan in 2019 for improving water conservation. A separate ministry of Jal Shakti was launched in May 2019 by merging the Ministry of Water Resources, River Development and Ganga Rejuvenation and Ministry of Drinking Water and Sanitation. It is targeted to achieve 'Har Ghar Jal' by 2030, in line with the UN's SDGs.

### WAY FORWARD

Management of all water resources will need to be improved for ensuring provision and quality of water. The re-use and waste water recycling is needed along with improving water productivity, energy efficiency. It is the responsibility of every one to save water wisely and tactfully. Citizens should work hand in hand with the government and its agencies for water issue. Harvesting of rain water is high need of the hour to



save the precious resource which otherwise could be lost due to lack of awareness. Just like in the state of Tamil Nadu, where, in 2001, the state government is making it mandatory to each household for rainwater harvesting structure and now, they are showing the results. The concept of China's sponge city that aims to recycle 70% of rainwater needs to be replicated. Some of the adoptable friendly water harvesting techniques to conserve water resources are water structures in Jalgaon, Jalna districts of Maharashtra, and bawri, tanka, taka, johar, khadin, anicut concept in Rajasthan.

## REFERENCES

- Bain, R., Cronk, R., Hossain, R., Bonjour, S., Onda, K., Wright, J., Yang, H., Slaymaker, T., Hunter, P., Prüss-Ustün, A. and Bartram, J. 2014. Global assessment of exposure to faecal contamination through drinking water based on a systematic review. *Tropical Medicine & International Health*, 19(8), pp.917-927.
- Fisher J., 2006. "For Her It's the Big Issue: Putting Women at the Centre of Water Supply, Sanitation and Hygiene." Evidence Report, Water Supply and Sanitation Collaborative Council, Geneva.
- Hutton, G., Rodriguez, U.P., Winara, A., Anh, N.V., Phyrum, K., Chuan, L., Blackett, I. and Weitz, A. 2014. Economic efficiency of sanitation interventions in Southeast Asia. *Journal of Water, Sanitation and Hygiene for Development*, 4(1), pp.23-36.
- Jaramillo, F. and Destouni, G. 2015. Comment on Planetary boundaries: guiding human development on a changing planet. *Science* 348 (6240):1217.
- Rana, A.K.M.M. 2009. Effect of water, sanitation and hygiene Intervention in reducing self-reported waterborne diseases in rural Bangladesh. Research and Evaluation Division, BRAC Research Report, Bangladesh.
- United Nations Committee for Development Policy Report. 2018. on the twentieth session (12–16 March 2018) Economic and Social Council Official Records, 2018 Supplement No. 13.

\*\*\*