Drinking Pure Water and Our Health

Ranadheer Singh*

Introduction

As per the Rigveda, all life evolved from water (apah). Pure water is called divyajal due to its properties of sheetalam (cold to tough), Suchihi (clean), Shivam (replete with useful minerals and elements), Istham (transparent) and vimlam lahu shadgunam (acidic balance should not exceed normal limits). Besides, there are copies references to medicinal properties of water.

Today, the world health organisation (WHO) predicts worldwide shortage of portable water within the next ten years. Much of the world's drinking water is contaminated by agricultural, industrial, pharmaceutical and domestic pollution. Many ground water sources harbour highly toxic natural contaminants. Consumption of contaminated water overtime can result in cancers, bone problems, nervous system damage, and more subtle toxic health effects. Safe water is defined as water of sufficiently high quality that it can be consumed or used without risk of immediate or long term harm. The focus in on human health rather than environmental health issues.

India's water sector is showing a sign of water stress in terms of per capita availability and heading towards water scarcity in the near future. Severe water crisis would imply, inter alia, more water borne diseases, low agricultural and industrial productivity, and drinking water shortage. Today, the water sector in India presents a dismal scenario when one looks at its quality, which reduces further availability of safe water. About 70 per cent of the surface water and ground water are contaminated.

Globally, only 0.4 per cent of total water on mother Earth is at our disposal for meeting our needs, of which, roughly 70 per cent is used for agriculture, 22 per cent for industry and 8 per cent for domestic purposes. By 2030, an estimate by 2030 Water Resources in its report "Chartering Our Water Future" shows that the global fresh water demand would be about 40 per cent above the existing reliable and sustainable supply of fresh water. Due to climate change, there could also be variability of water availability across nations over time.

The quality of water is measured by the presence of some'beyond threshold level' parameters in water. In the case of fresh water, these parameters, inter alia, include biological oxygen demand (BOD) level, level of total coliform and faecal coliform, while for ground water, level of trace elements, extent of saline-fresh water interface, inter alia, determine the level of contamination. Such trace elements may include arsenic, heavy metals, etc. A recent report of Central Pollution Control Board (CPCB 2013) points out contamination of river water at identified points when measured, inter alia, in terms of BOD, and coliform bacterial count, thus indicating the extent of water quality degradation in different parts of India. In the case of ground water, inland salinity, coastal salinity, fluoride, arsenic, iron, nitrates are some of the contaminants. States such as Rajasthan, Gujarat, Bihar, Assam, amongst others, are affected by such contamination.

The river water gets contaminated mainly due to inefficient functioning of ETPs (Effluent Treatment Plants), CETPs (Common Effluent Treatment Plants), STPs (Sewage Treatment Plants) resulting in dumping of untreated industrial wasters into the river; discharging of untreated municipal wastes into rivers; lack of onsite treatment of contaminants; non point sources of pollution including pesticide contaminated agricultural run off, piling up to materials at most river banks for religious uses, etc. In the case of ground water, contamination takes place due to excessive drawal of ground water resulting in inland salinity,

* **Asst. Professor, Physical Education, Dr. R.M.L. P.G. College, Bhairo Talab, Varanasi**

due to saline water overlying fresh water acquifer, the presence of fluoride minerals in both igneous and sedimentary rocks, and use of arsenic and its compounds in pigments as pesticides and herbicides, etc. For example, against all India average of ground water withdrawal of 61 per centages, Punjab and Haryana withdraw more than 100 per cent, and thus, inland salinity is more prevalent in the arid/semi arid region of these states. The presence of arsenic is seen in the intermediate aquifers of 200-100 meter range while deep aquifer is free from this problem.

In case of most cities and the towns situated on the river side, discharge of untreated municipal waste into the river is a regular phenomena. For example, the Rajpur drain in Patna running parallel to the Ganga, discharges the drainage of the entire city into the river, thus contributing to the high faecal coliform content of the river. Similarly, in the case of Gurgaon city, which claims to treat about 50 per cent sewerage generated daily before discharging them into the Yamuna river, the remaining 50 per cent are left on open land, thus allowing them to seep into the ground, resulting in contamination of water. The real challenge is how to motivate the municipal authorities which are starved of expertise and financial resources, for treatment of all city sewerage after intercepting the same at suitable points, before discharging them into the river or otherwise.

The non point pollution coming from varied sources (e.g. run off from agricultural fields) carries sediments, chemicals or pesticides. There is a need to arrest generation of contaminants before they become mobile or treat pollutants already in transit before they reach the river. Preventive measures such as structural, non-structural methods, source control measures, or treatment of pollutants in transit, can be used depending on the situation.

Arsenic Menace

In order to protect health and prevent sickness and mortality, water supply should be of good quality and accessible to all users. Quality of water as stated earlier is often affected due to natural contamination such as arsenic chloride. Arsenic is probably the most arsenic affected area due to various reasons: about 90 per cent of people known to be affected due to arsenic in drinking water, live in Asia. The most seriously affected countries in South East Asia are situated in the river basins of Ganga, Brahmaputra and Mekong covering countries and Mekong covering countries such as India, Bangladesh, Nepal, Myanmar, Thailand, Laos, Cambodia and Vietnam. The two Asian countries which are also seriously affected are China and Taiwan. It is reported that more than 150 million people live in the arsenic prone areas.

Drinking of arsenic rich water over a long period is unsafe as arsenic is a documented carcinogen. The common symptoms of chronic arsenic poisoning include hyper pigmentation, dye pigmentation and keratosis, which may turn into skin cancer and even lung cancer. Secondly, the food chain is also likely to get affected resulting in toxic implications affecting communities who do not even live in arsenic polluted zones. Reports show that there is a significant level of arsenic which goes into the body through food products (such as grains, vegetables, fruits) being cultivated using arsenic contaminated water or food being cooked using arsenic contaminated water.

Arsenic Remedial Strategy

(1) **Adequate steps should be taken for framing policies on mitigation of arsenic contamination** : Adequate steps should be taken for framing policies on mitigation of arsenic contamination. The policies may include use of rain water, or safe surface water or safe sub surface water resources. As far as possible, there should be conservation and refurbishing of old surface water sources such as ponds, lakes etc. There is a need to invest in a portfolio of technology options after adopting the pilot testing of new technologies before their implementation. As regards implementation of arsenic removal program, community scale approach should be better adopted. Public private partnership for implementation should be

attempted with adequate supervision by agencies like PHED (Public Health Engineering Department) for ensuring quality, quantity and transparency.

(2) **There is a need for proper monitoring, surveillance and risk management for the mitigation of arsenic menace** : There is a need for proper monitoring, surveillance and risk management for the mitigation of arsenic menace. Water quality monitoring should include source coding, depth of well and use of GPS (Geographic Positioning System). There should be involvement of the community. Surveillance of the community . Surveillance of arsenic contaminants should include testing of PH, iron, phosphate, bicarbonate, manganese, and sulphate. There should be protection of sources through artificial recharge and in situ dilution of contaminants and monitoring of water levels.

(3) **Food safety needs should be given the maximum attention to control entry of arsenic in the food chain** : Food safety needs should be given the maximum attention to control entry of arsenic in the food chain. Specification of arsenic in various foods is urgently required. FSSAI (Food Safety and Standards Authority of India) limits of metal contaminants in food products should be strictly followed. The entire food safety chain needs to be routinely monitored by assessing entry of arsenic through water used for cultivation as well as through water used for cooking. People living in non-endemic areas are also at risk due to food import from endemic areas. Infants are more at risk due to higher consumption of arsenic per body mass. Pharmacists and health care workers should take active participation in public health programmes. There is a need for use of GIS (Geographic Information System) model for discovering new arsenic contaminated areas.

(4) **The need for adequate investment for ensuring water quality and water safety at national and state levels** : The need for adequate investment for ensuring water quality and water safety at national and state levels. The marginal population should also be included under the arsenic mitigation scheme. There is a need for creating people' awareness and they have to be involved at every step. A proper communication strategy should be developed. Also, behavior change of the population in the affected areas and the community mobilization are critical.

Open Defection

More than 50 per cent open defecators of the world live in India. India was not able to meet the MDG (Millennium Development Goals) Target 2015 for improved sanitation. The Joint Monitoring Program (JMP) of the United Nations (2015) show that about 564 million people practise open defecation in India out of 964 million open defecators of the world. India's urban slums and rural areas both suffer from this problem. About 17 per cent or urban notified slum population and more than 50 per cent in non notified slum areas do not have access to improved sanitation facilities. Thus, they defecate in open areas. Open defecation implies a lack of safe disposal of human excreta, thereby affecting the health of people. In particular, ground water is contaminated in addition to contamination of surface water. Of human excrete, faeces are most dangerous to health; diarrhoeal diseases are the most faeco-oral diseases globally, causing more than one million deaths annually. There is a need for safe management of faecal waste: right from emptying, transport, and treatment to reuse or disposal.

The problem of open defecation is bigger in smaller cities (cities with population below 100,000). As per 2011 Census, there are 81.4 per cent households, with toilets of various types: septic tanks (38.2 per cent), pit latrines (8.8 per cent), insanitary latrines (1.7 per cent), sewerage connection (32.7 per cent), while 18.6 per cent have no household toilets-they use community toilets (6 per cent) or defecate openly (12.6 per cent). Improved sanitation together with safe water and good hygiene is necessary for good health and sustainable development. The Swachh Bharat Mission (urban) program of the central government, which intends to eliminate open defecation completely by 2019, is a right step in this direction.

Need for Holistic Approach

1. Sanitation, hygiene and safe water are the basic requirements for good health. Our national policies and state policies in these areas should complement each other. In addition, there should be institutional synergy as well, for administering these policies at various levels.
2. As regards ground water, the central government's initiative for mapping the entire acquifer during the 12th Five Year Plan and thereafter, is a timely initiative if implemented, but this needs to be supplemented with participatory management by various stakeholder. This is a gigantic task, as stakeholders need to be convinced on the efficacy of this approach and be involved. By knowing the acquifer status of ground water, various remedial actions such as recharging, rain water harvesting, removing ground water contamination can be undertaken in a joint collaborative arrangement between stakeholders and the government. On the regulatory side, the existing "Easement Act" which allows any land owner to extract ground water in spite of the fact that such a withdrawal may affect adversely other users, needs to be relooked and modified.
3. There is a need to implement the basin level water management concept, rather than river centric approach. Also the synergy between surface water and ground water has to be appreciated and recognized. Sources of contamination, point sources such as industries, non point sources such as agricultural run off, should be identified, and arrested. The Namami Gange program of the central government is a good example for applying the above concept to some extent. Under this program, there are initiatives in areas such as having clean effluent discharges from nearby industries, river front development, arresting non-point sources of pollution, monitoring on real time basis, solid waste management, conservation of wetlands, rural sanitation facilities along the river Ganga, pious refuse management and improved methods of last rites, afforestation-conservation of flora, conservation of biodiversity including acquatic life, etc. A replication of such initiatives should be introduced in other rivers as well.
4. A massive awareness building program for various stakeholders is called for at the central state, and sub national levels for understanding the extent of health hazards being posed by the degraded water quality, absence of sanitation poor hygiene, and poor faecal waste management. Towards this campaign, civil society can play a big role to supplement the efforts of the governments.

Conclusion :

Finally we can say that contaminated water caused many diseases and harness in our body and health. Whenever safe and pure water causes good health in our body and health. There is a true proverb in hindi **"Jal hai to kal hai"** which means if there is water then only our future is safe. However man has been mercilessly misusing this precious resource given by nature. It is time that the bugle call is sounded to make everyone realize that water cycle and the life cycle are one. Therefore, from today tell all of us start saving each and every drop of water and conserve this priceless resource.

Reference :

- a b c d e f "Water fact sheet N^0 391 July 2014, Retrieved 24 May 2015.
- Mara Duncan et al. Nov. 16, 2010.Sanitation and Health. Available at http://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1000363
- The Hindustan Times News paper
- The time of India Daily News paper
- Water requirements, Impinging factors and Recommended Intakes (Pdf) World Health Organisation pp. 25-34.

●