

Respect water, conserve water, recycle water!



In conversation with Dr. Ashok Kumar Ghosh, Erasmus Mundus Fellow, professor and head of Department of Research at Mahavir Cancer Institute and Research Centre since 1 July 2016; adviser of East Zone Water partnership, an affiliate of Global Water Partnership (GWP); and former professor-in-charge of Department of Environment and Water Management, A N College, Patna, India, (forty-four years of active service). He was awarded Excellence in Water Showcase Final at 7th World Water Forum in 2015 for his research in arsenic mitigation in rural Bihar. Currently he is working on a DST-UKIERI supported research project Nutri-SAM in collaboration with University of Salford, UK and DST-NERC sponsored project FAR-GANGA in collaboration with University of Manchester, UK.

What inspired your interest into water related issues?

I am a Bengali, born and brought up in Bihar, which is the land of rivers and many wetlands. My ancestral home is very close to river Ganga in Bhagalpur district. Water and water bodies always fascinated me since my childhood. My profession gave me opportunities to further explore and be in touch with the topic of my interest—water and the environment. This came to the helm in 1996 when University Grants Commission (UGC), New Delhi, approved a plan to open a new course: Environment and Water Management at A N College, Patna. The principal of the college entrusted me to start this new highly specialized course. I accepted the assignment and gradually my fascination for water was converted to passion.

You have done a water quality survey of the entire state of Bihar; please share some insights?

Water quality is one of the chapters for the Environment and Water Management course formulated by UGC. We started studying water quality issues in and around Patna with student interns of the Department. The turning point in my water quality research in my academic carrier came in 2004 when UNICEF approached me to examine the possibility of arsenic-contaminated aquifers in Bihar. Nobody was ready at that time to accept that Bihar is also on arsenic map as there was no major research done to know the water quality status in groundwater of Bihar. I accepted to work on Project Arsenic sponsored by UNICEF in Patna. My study revealed that most of the Diara area near the banks of River Ganga had very high arsenic content. We recorded the highest arsenic value of 784 ppb in Maner area of Patna district against WHO permissible limits for drinking water of 10 ppb.

This was followed by my UNICEF-sponsored study in districts of Bhojpur, Bhagalpur, and Vaishali, which also confirmed that all these districts had arsenic-contaminated aquifers. My research group in Bhojpur district reported the highest value 1,860 ppb of arsenic in 2006. As of today we have tested more than 46,000 drinking water sources in Bihar and have found eighteen districts with high arsenic content, and the highest value recorded is 1,906 ppb in Buxer district. This was followed by many more projects from different funding agencies for water quality issues. The comprehensive water quality studies by my research group in all the thirty-eight districts of Bihar led to the finding that arsenic in groundwater is not the only health hazard. If the districts located at both banks of River Ganga and the Himalayan Terai region have arsenic in groundwater, the hard rock area of South Bihar has very high fluoride content (up to 16 ppm). A total of twelve districts of Bihar have very high fluoride content in groundwater, which is another health hazard. Besides arsenic and fluoride, there are many more contaminants in the groundwater of Bihar, such as iron, nitrates, and pesticides. Safe drinking water to all is still a dream in the state of Bihar. Many mitigation structures have been installed in water quality challenged areas, but most are defunct due to a lack of proper operation and maintenance of the mechanisms.

How is presence of arsenic in water affecting the humans?

Arsenic is a known human carcinogen, often described as slow poison. The health issues start appearing only after a long ingestion time period. We have observed many health issues in the arsenic-exposed population of Bihar. Initial symptoms are melanosis (disorder of pigmentation), keratosis (an area of skin marked by overgrowth of horny tissue), leuco-melanosis (hyper pigmentation), cardiac problems, respiratory problems, and cancer of skin, urinary bladder, and liver. The problem is further aggravated, as there is no medicine to treat arsenicosis (a chronic illness resulting from drinking water with high levels of arsenic over a long period of time such as five to fifteen years). The only option is to revert to arsenic-free water and high-protein-content nutrition.

Is water quality linked with rampant cases of cancer?

There is direct correlation of arsenic with cancer. Many epidemiological studies have confirmed that arsenic is a bio-accumulative carcinogen. Currently I am working at Mahavir Cancer Institute and Research Centre, Patna, where approximately 25,000 new cancer patients are registered per year. A vast majority of them are coming from arsenic hot spots. We are getting many cancer patients with visible symptoms of arsenicosis and elevated arsenic level in blood, hair, and nails. Arsenic is not the only carcinogen, but it is one of major carcinogens in Bihar with very high incidence of cancer.

We all know that water quality impacts health, but with increased awareness levels, there is a high usage of water filtration methods in urban households; what is your view on this?

I am personally against putting in a water filter without testing the drinking water quality. Most of the deep aquifers of Bihar are arsenic-free and very good for drinking. In my residence, drinking water comes from a 290 ft-deep aquifer, and it is excellent in quality without any filtration. I do not use any water filter in my home, and I am in perfect health at the age of sixty-six. Furthermore, if water has acceptable total dissolved salts (TDS) levels, why would we need a costly RO filter? A simple candle filter is sufficient for taking care of TDS. The RO filters are costly, rejected water is a huge loss, and filtered water is not balanced for drinking. In my opinion, the use of the filters should be need-based.

Please share your plans and the message you would like to give to all of us as an integrated part of this ecosystem?

My future plan is to continue water quality research and focus on health impacts. In addition to the known contaminants like arsenic, fluoride, iron, and nitrates, there are many more emerging contaminants for which very few studies have been done in India. These emerging contaminants are important because the risk they pose to human health and the environment is not yet fully understood. Pharmaceuticals, personal care products (PCPs), and endocrine disrupting compounds (EDCs) are among the prime examples of emerging contaminants. Up to 90 percent of oral drugs pass through the human body and end up in the water supply. Personal care products (soaps, cosmetics, fragrances, etc.) also find their way into our water. Endocrine disruptors are substances that may interfere with the function of hormones in the body. Trace amounts of these contaminants are being discovered in water throughout the world. Our future studies will improve understanding of several emerging contaminants, including perchlorate (commonly used as an oxidizer in rocket propellants, munitions, fireworks, airbag initiators for vehicles, matches, and signal flares), pharmaceuticals, PCPs, and EDCs.

My message to all is "respect water, conserve water, recycle water. It is precious for existence of life on mother earth."

(Interview by Lalit Sharma, director, Adaptive Technologies-Water, and Pooja O. Murada, director, Communications, S M Sehgal Foundation)