

Fight against fluorosis

By Aparajeeta Vaibhav

Imagine a disease that restrains you from the physical activities most people can do and slowly making you look much older than your actual age. People with crippled legs, some in an immobile state, are a common sight in some villages. Unfortunately, many people are not aware of the reasons for their deteriorating condition. Unaware of the silent killer present in their bodies, they seek medical help complaining of pain and are given antibiotics and painkillers that further worsen the condition. Fluorosis has overshadowed their fate.

Fluorosis is a disease caused by excess fluoride intake and has been flagged as a global threat. At least 200 million people are suffering from this disease across twenty-five nations.¹ India and China, as the most populous countries in the world, have been the worst affected by the disease.

Groundwater is the major water source used for consumption in India. Fluoride contamination in the vast geographical expanse of groundwater is mainly due to geogenic (of or relating to the history of the earth) factors. Widely distributed in lithosphere, fluoride is the thirteenth most common element found in the earth's crust. India has become a hotspot of endemic fluorosis affecting over 62 million people with serious health issues such as skeletal fluorosis (crippling of bones), dental fluorosis, neurological manifestation (includes the brain, the spinal cord, and the nerves).² Dementia, Alzheimer's and aging brain, and muscular manifestations are growing.

Sehgal Foundation has recently begun work to mitigate fluorosis through a pilot project in Nuh, Haryana. The approach comprises the following:

- **A situation analysis** began with mapping the presence of fluoride in water through Geographic Information System (GIS) to identify affected areas in terms of expanse and extent, and to identify safe water sources for the local people. In order to assess the impact of fluoride in water, particularly on children, a fluorosis survey is done in schools.
- **Sensitization and awareness building** are used as a pathway toward recovery and eradication using massive communication programs. Nothing like this has been done before to combat fluorosis on a mass scale. Mass media has an important role to play in this process. Sehgal Foundation has used community radio programs to sensitize the population about fluorosis caused by excess of fluoride intake. The foundation team work on awareness-building around prevention and remedial measures include campaigns, community meetings, school meetings, and radio programs with topics like changing food habits and the role of nutrition management in combating fluorosis. The team plans to initiate interactive sessions with female members of affected families.
- **Combating the problem** for those already suffering from fluorosis is limited to management of its impact on health. Practitioners share that consumption of calcium, magnesium, and vitamin C stops the increase of

¹ S. Ayoob & A. K. Gupta (2006) Fluoride in Drinking Water: A Review on the Status and Stress Effects, *Critical Reviews, Environmental Science and Technology*, 36:6, 433-487, DOI: 10.1080/10643380600678112.

² See <https://www.indiawaterportal.org/topics/fluoride>.

fluorosis and curbs its impact. Moringa is a free natural source of vitamin C, calcium, magnesium, and protein that has proved useful for fluorosis management and prevention. The team facilitated the plantation of moringa trees and promotion of the consumption of its leaves in various forms. During August 2018, the foundation team and community members planted 8,000 moringa plants that are now ready for leaf harvesting. Community members have started using these.

- **Water treatment** technologies used in India for removal of fluoride from water include activated alumina and reverse osmosis (RO). The Sehgal Foundation team does not support the adoption of either of these because activated alumina is associated with risks, RO is cost and energy intensive, and neither technology is sustainable. The Adaptive Technologies-Water team is working on developing a sustainable low-cost technology that can be adopted by rural households.
- **To implement fluorosis mitigation** the team has done de-fluoridation of water at the block, district, and state levels to garner community support and used a multifaceted approach of education and consultation with communities and stakeholders. During the lab testing and work with the people, many insights and innovations emerged that will help combat fluorosis.

Sehgal Foundation's experiment on fluorosis mitigation is a step toward achieving India's goal for sustainable and inclusive development by providing access to safe drinking water. In addition to developing suitable technology, the initiative requires soft techniques such as awareness campaigns, sensitization, and setting examples, etc., for behavioral change. The efforts to mitigate fluorosis cover technical and normative fronts and include establishing forward and backward linkages. The goals are to test the technology suitability in varied conditions, achieve contextual adoption and scale up successful solutions, and advocate for their adoption by the State Public Health Engineering Department.

The fight against fluorosis continues . . .

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