

Worsening Arsenic contamination in Bihar: another Bengal delta calamity in making?

Prologue:

From last 19 years' survey analyzing around 2,21,000 water samples, around 50,000 biological samples, screening around 20,00,00 villagers with our medical team we have found a good portion of the states and countries [Uttar Pradesh, Bihar, Jharkhand, West Bengal, Assam, Manipur and Bangladesh (jointly with Dhaka Community Hospital)] in the Ganga-Meghna-Brahmaputra (GMB) plain—an area of 569,749 km², with a population of over 500 million are at risk from groundwater arsenic contamination and its health effects (website: www.soesju.org).

Arsenic in Bihar: the situation deteriorates

In June 2002 when we first reported arsenic contamination in Bihar in middle Ganga plain (Ref. 1) it was vehemently refuted (Ref. 2, 3). Today on basis of analyzing

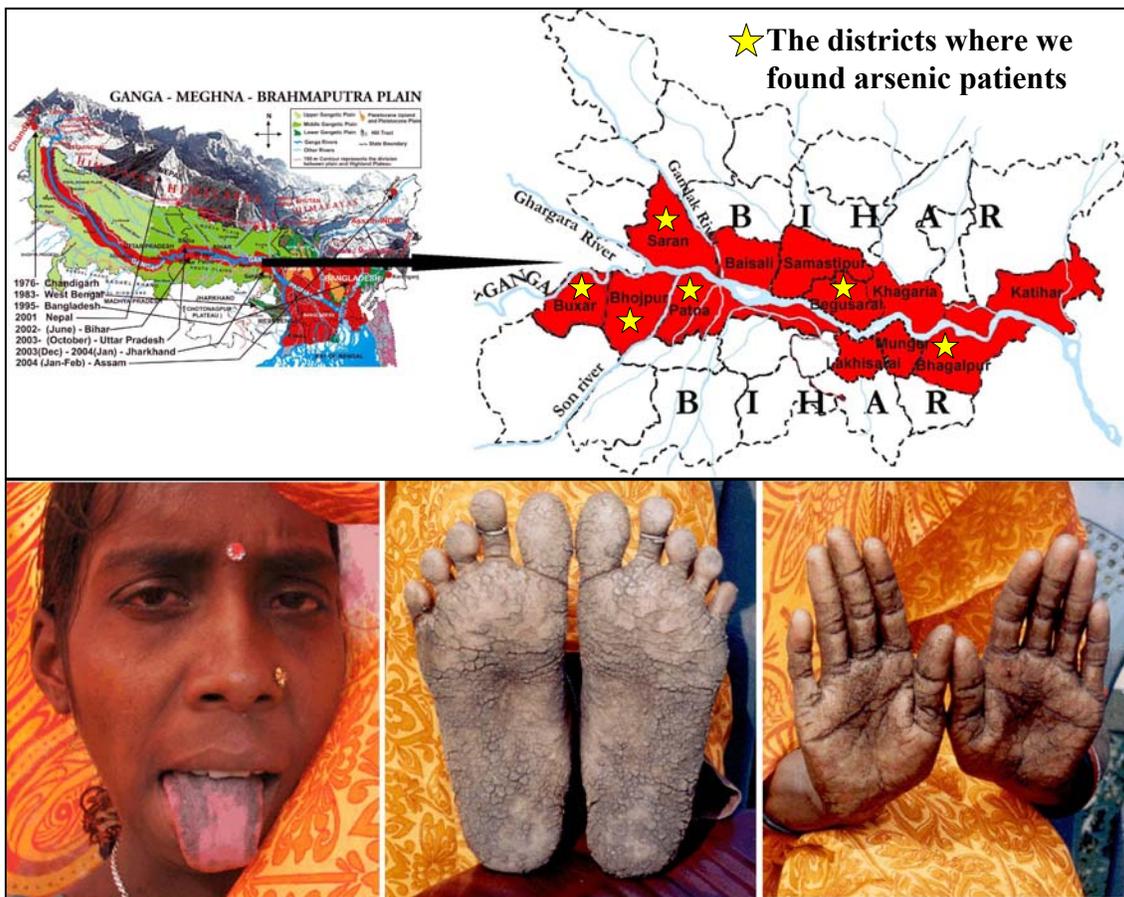


Figure 1

15,000 samples from Bihar we have found arsenic concentrations above 50 µg/l in 12 districts, 32 blocks and 201 villages. The districts, Bhagalpur, Khagaria, Munger, Begusarai, Lakhisarai, Samastipur, Patna, Baishali, Saran, Bhojpur, Buxar, and Katihar all lie by the side of Ganga and in 6 of them (Bhojpur, Saran, Begusarai, Bhagalpur, Patna, and Buxar) we have already identified hundreds of subjects with arsenical skin lesions (Figure 1). **More are coming to fore with the continuing surveys.**

Our medical team confirmed the presence of arsenical skin lesions, consistent peripheral motor and sensory neuropathy as well other neurological abnormalities in the arsenicosis patient of Bihar. We also observed an apparent increase in fetal loss and premature delivery in the women with the elevated level of arsenic in their drinking water.

Hair, nail and urine are proved biomarkers for arsenic. Around 1500 biological samples from arsenic affected villages have been analyzed; we measured inorganic arsenic and its metabolites in urine and total arsenic in hair, nail and skin scale. High arsenic concentration in urine is indicator of recent arsenic exposure. In arsenic affected villages of Bihar, high concentration in urine of both patients and non patients indicate they were drinking contaminated water. It appears from the analyses that **many villagers may be sub-clinically affected and they are continuing drinking the contaminated water since they were mostly unaware of the problem before we surveyed them.**

Infants and children are considered to be more susceptible to the adverse effect of toxic substances than adults. Our last 19 years field experience in West Bengal and 10 years in Bangladesh, we observed that normally children under 11 years of age do not show arsenical skin lesions although their biological samples contain high level of arsenic. However, we have observed exceptions as when (i) arsenic content in water consumed by children is very high ($\geq 1000 \mu\text{g l}^{-1}$) and (ii) arsenic content in drinking water is not so high (around $500 \mu\text{g l}^{-1}$) but the children's nutrition is poor. **High arsenic content in their biological samples are showing that children in the arsenic affected areas of Bihar have a higher body burden.**

A note of caution:

Though first case of arsenicosis was revealed in West Bengal in early 1980s, the widespread contamination was not recognized until 1995. Similar pattern followed in the late recognition of groundwater arsenic contamination of Bangladesh. **In Bangladesh and West Bengal, at present less people are drinking arsenic contaminated water due to growing awareness and access to arsenic safe water.** But no doubt the problem would not have attained such gravity, if it were not ignored for quite a long time. Unfortunately today similar mistakes are being repeated in Bihar, UP, Jharkhand, and Assam where still the villagers are drinking contaminated water. Non recognition of truth continues. The administration in Bihar is yet to learn from the mistakes committed in a neighboring state of West Bengal. **A thorough survey is required in these areas to assess the magnitude of contamination. We urge the concerned authorities to**

immediately take stock of the current situation in Bihar, Uttar Pradesh, Jharkhand, Assam and other affected north-eastern hill states and take appropriate measures like generating awareness about arsenic problem and arsenic safe water, the only medicine to the affected population.

References:

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2. Acharya SK, Shah BA. "Risk of arsenic contamination in groundwater affecting the Ganga alluvial plain." *Environmental Health Perspective* 2004; 112 (1): A19-20.
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