

## Groundwater Arsenic Contamination: Food Safety and Human Health Hazards in Bangladesh

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### ABSTRACT

*Groundwater is a remarkable source for supplying drinking water (more than 95% of total population) as well as in sustainable irrigated (70-80% of total irrigation) crop production in Bangladesh. Extent and severity of arsenic contamination of groundwater is a crucial issue and a threat to human health and food safety in Bangladesh. Out of 64 districts, water in 61 districts has arsenic concentration above safe limit. About 30 million people are directly at arsenic contamination risk. About 38,000 cases of arsenicosis patients are identified and it is suspected that over 0.2 million people have been suffering from arsenic-related diseases. Regarding arsenic pollution, probably, Bangladesh is the most vulnerable country in the world. Still now, the cause of groundwater arsenic contamination is unknown, although initially several anthropogenic sources were put forward. Gradually, all were rejected based on the field observations. Finally, it was recognized that the source of arsenic was naturally-occurring geological deposits. Two main hypotheses, "pyrite oxidation" and "oxy-hydroxide reduction" are put forward to clarify the source, cause, formation, mobilization and distribution of arsenic contamination. First hypothesis, contamination is human-made, which has a relationship with excessive groundwater withdrawal and second one, the contamination is natural. However, none of them have been studied thoroughly with accurate field data and evidence. Arsenic moves to human body mainly through drinking water and food. Rice having higher concentration of inorganic arsenic covers a large share of Bangladesh diet. Vegetables, having >80% water content, when irrigated with arsenic-contaminated water is likely to get contaminated by arsenic. High concentration of arsenic in soils accumulated through irrigation water might have serious negative impacts on agricultural environment, soil-crop quality and production, livestock and fishery production and its carry-over effect on food chain, thus, may jeopardize the country's food safety campaign.*