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Decision Support System for Vulnerability Assessment in Arsenic Contaminated Areas

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After a century of efforts to combat groundwater arsenic (As) contamination, which includes evolution in As filtration technologies from adsorbent-based domestic filters to nano-filtration units, and expenditure of billions of dollars on As-mitigation, As-free water still remains unavailable for 500 million affected people. We are proposing a Decision Support System (DSS) prototype, that will provide users and decision-makers a scientifically validated and technologically accessible tool to assess differing levels of vulnerability (resilient<at risk< less vulnerable<moderate vulnerable< highly vulnerable) in As-contaminated areas. Decisions end-points were derived using WEKA (The Waikato Environment for Knowledge Analysis), a Java-based statistical modeling tool and the final prototype was build using a Java-based application platform, NetBeans (Integrated Development Environment). The DSS will be an executable file (.exe) format which could be easily used on any computer. The vulnerability indices were derived based on the socioeconomic, demographic, health, and biophysical information from As-contaminated areas in the mid-Gangetic-plain in India. Based on a set of questions designed for decision makers, and their responses, the prototype DSS would compute vulnerability indices. Therefore, the DSS will help in creating As mitigation strategies based on the computed vulnerability indices derived from the local conditions in the affected communities. As per our knowledge, this is the first time we are proposing a DSS for vulnerability assessment in As contaminated areas. It enables decision-makers to create robust As mitigation strategies through the most efficient allocation of the available resources to the right places and communities.

Keywords: Arsenic; Vulnerability Indices; Decision-Support-System; Decision-making