GIS Modeling and Probabilistic Assessment of Fluorine Hazard in Groundwater in Nalgonda District, Andhra Pradesh, India.

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ABSTRACT

Fluorine hazard has reached alarming proportions in Nalgonda District, for it to become the worst fluorosis-hit area in the world. Nearly 80 percent of the population are affected by fluorosis, including the more damaging skeletal fluorosis. In this also draught-hit area, the only source of drinking water is groundwater in which fluorine values reach up to 11 ppm, far beyond the permissible limit of 0.6 ppm for human consumption. Indo-Netherlands cooperative efforts include (1) identifying the spatial relationships between fluorine values in and geological/geomorphological parameters that are associated with the groundwater, and (2) based on the relationships, delineation and recommendation of less hazardous areas where new drinking-water wells can be dug.

Towards achieving the above, multi-source layers of relevant geological, geomorphological and geohydrological parameters are integrated and analyzed using GIS facility. A Bayesian probability model is used to delineate areas where fluorine hazard is estimated to be low. Maps of these areas are distributed by the local authorities to the villagers, as an usable guide in choosing the locations of new drinking-water wells.