Tainted by uranium: On groundwater contamination

Reports of widespread **uranium contamination in groundwater** across India demand an urgent response. A study, published in *Environmental Science and Technology Letters*, has found over 30 micrograms per litre (mcg/l) of the heavy metal in parts of northwestern, southern and southeastern India. Drinking such water can damage one's kidneys, and the World Health Organization prescribes 30 mcg/l as an upper limit. Unfortunately, the residents of the regions surveyed were using the contaminated wells as their main source of drinking water. These findings highlight a major gap in India's water-quality monitoring. As the Bureau of Indian Standards does not specify a norm for uranium level, water is not tested regularly for it. This is despite the fact that evidence of uranium contamination has accumulated from across India over the last decade. A 2015 Bangalore study, for example, found uranium levels of over 2000 mcg/l in the southern part of the city. Other studies found levels of over 500 mcg/l in Andhra Pradesh and Telangana. The *Environmental Science* paper adds new data to this body of evidence by sampling wells in Rajasthan and Gujarat.

The health effects of drinking uranium-tainted water merit special attention. A few small animal and human studies have found that the heavy metal damages the kidneys. The studies indicate that this is a chemical effect, rather than a radiological one, even though uranium is radioactive. But the chronic effects of uranium consumption are still unknown. Could there be, for example, a link between the high rates of chronic kidney disease (CKD) in India and uranium exposure? In a survey conducted between 2005 and 2010, an Indian registry found 8,385 CKD cases with no known cause. One cluster of mystery disease, located in Srikakulam district in Andhra Pradesh, has stumped epidemiologists for years. It is impossible to say if these clusters have anything to do with groundwater contamination, unless researchers look at it systematically. Another critical area of research is the mechanism by which uranium enters groundwater. The *Environmental Science* paper identified two types of terrains with heavy contamination. In Rajasthan and other northwestern regions, uranium occurs mostly in alluvial aquifers; while in southern regions such as Telangana, crystalline rocks such as granite seem to be the source. When groundwater is over-extracted from such soils, the researchers suggest, the uranium is exposed to air, triggering its release. These hypotheses must be explored, because they will help determine where to find safer water. This is what happened in West Bengal, where a decade of research revealed why the contaminant arsenic mainly occurred in shallow aquifers. Researchers found that a combination of geological and chemical triggers brought arsenic to the Ganga delta in the Holocene era, and then released it into the sediments from that period. Similar research across India's uranium hotspots can uncover who is at risk, and how to protect them.

The new biofuels policy is high on ambition, but success will depend on the details

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