Sustainable solution for drinking water supply in rural India affected by groundwater pollution

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The present study explores sustainable solutions for providing safe drinking water in an area currently served only by groundwater. Groundwater development here has reached criticality and is contaminated with fluoride and uranium. As there are only a few small seasonal streams in the area, roof-water harvesting and utilization of tank/lake water are tested as alternative approaches for drinking water supply. The study area is in the Chikkaballapura district of eastern Karnataka, India, where the average annual rainfall is 700 mm. The quantity of roof water that can be harvested from the built structures in the study area can adequately meet the drinking water requirements, although not the entire domestic water needs. A nearly perennial lake located in the upper reaches of the micro-watershed stores 301 million litres of water that needs only routine filtration and chlorination. This study shows that sustainable water management practices such as roof-water harvesting and lake water utilization can replace the contaminated groundwater for drinking purposes.

Keywords: Drinking water, perennial lakes, polluted groundwater, roof-water harvesting, sustainable solutions.

practice. In villages facing health issues due to groundwater pollution and in the command areas of irrigation or multi-purpose projects, surface water supply from canals is being implemented. Reverse osmosis (RO) units have been installed in thousands of villages where groundwater is contaminated. These approaches have limitations: (i) surface water does not always reach remote villages in the command areas, and (ii) RO processing results in the expulsion of enormous amounts of wastewater, which is more contaminated than the water that has been treated and returned to the ground[4].

Therefore, there is a need to adopt more sustainable approach(es) to meet the drinking water requirements in such villages. In this study, we provide a sustainable solution for drinking water supply in a Gram Panchayat in eastern Karnataka, India. This case study relates to the Ganjigunte Gram Panchayat, which consists of 18 villages in the Chikkaballapura district of eastern Karnataka. The area is in a water-stressed zone where groundwater exploitation has exceeded the quantum of recharge[3]. Groundwater samples from 16 borewells which supply drinking water to the 18 villages in this Gram Panchayat are found to contain high