India's race for universal water supply shouldn't come at cost of water quality

Supplying treated piped water to all homes is an energy-intensive process, and India cannot rely on fossil fuels for Nal Se Jal.

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Recent reports about the residents of Chhattisgarh's Kundru village being compelled to consume drainage water due to the non-availability of hand-pump water shouldn't shock us. Villagers in other districts of the state have been through similar harrowing experiences for years. In the absence of piped water supply, these villages depend solely on hand-pump water for drinking and other domestic uses. This, unfortunately, is the grim reality of most villages in India, despite the Narendra Modi government's Nal Se Jal scheme launched in 2019 with the aim of providing approximately 18.93 crore rural households with 55 litres per capita per day drinking water.
But the race for universal water supply should ensure that safe water is not sidestepped in the country.

According to the latest Census data, only 49 per cent of urban, and a meagre 8.9 per cent of rural households in India get piped water from a treated source within their premises. With over 16.3 crore people having no access to clean water, and around 3.7 crore people being affected by water-borne diseases every year, India is amidst a severe water crisis.

The coronavirus pandemic has added new dimensions to India's water woes. Without piped water supply, people hustle to the available source (stand posts or tankers) to fetch water, making physical distancing practically impossible. Another prescribed preventive step, regular hand-washing, is also rendered undoable due to the non-availability of water. Under this scenario, the need for immediate measures to provide universal access to clean water—also a Sustainable Development Goal (SDG 6)—is critical. Though emergent, we need to strike a balance between ensuring the quality of water supplied and the sustainability of the water supply process. Here is where renewable energy comes in.

Renewable energy to the rescue

Supplying treated piped water to all homes is an energy-intensive process. Therefore, using energy from the grid system (with fossil fuel as the source) cannot be a sustainable option for India, owing to the associated environmental damage. Since grid energy is the main source being used today, it is no surprise that India's burden of adverse health

impacts due to coal-power-plants emissions is among the highest in the world. As energy cost constitutes 90 per cent of the operating expenses (OPEX) that have to be borne every year, the high price of grid energy makes it a poor choice economically as well.

The guidelines of the Nal Se Jal scheme look at using grid energy by and large, while considering exploring solar energy-based water supply systems only for isolated or tribal villages.

The findings from a recent study by research-based think tank Center for Study of Science, Technology and Policy (CSTEP) on the estimation of energy requirement for treatment and supply of water, make a strong case for transitioning to renewable energy for supplying clean piped water nationwide. Importantly, the variability of sources for harnessing renewable energy poses no significant constraint here, because water can be purified and stored safely when enough energy is available, and provided whenever needed. The study helps estimate the solar-photovoltaic capacity required to supply treated water across India as 31 GWp (gigawatt-peak). With over 750 gigawatts of solar and 302 gigawatts of wind potential, India has a tremendous capacity to use renewable energy for purification and pumping of water. It is also favoured because it can bring down the operational cost of supplying water considerably.

However, providing an enduring solution to the water crisis requires more than a shift to renewable energy. It calls for designing approaches that employ renewable energy in a manner that optimises energy use and boosts economic viability.

The CSTEP study indicates that renewable energy-based community water purification systems can offer such a solution. They can also help deal with the challenges posed by the pandemic.

Community-level solutions

Given the energy-intensive nature of the process of supplying piped water, optimising energy use within the process assumes high priority, especially in the face of depleting water levels and high contamination of water sources. Energy optimisation will also translate directly into lower costs, since energy cost is the main constituent in the overall cost of this exercise.

Renewable energy-based community water purification systems can be set up in areas where groundwater is the primary water source. Through this system, the energy consumed for purification can be substantially reduced, by considering supplying two grades of water to each household: potable water for human consumption and non-potable water for washing, cleaning, etc. The study estimates that under this approach, the energy required to supply an adequate amount of clean water to all households in India would be around 117 gigawatt hours per day, which is much lower than that required under the

conventional methods [where the same (higher) grade of water is supplied for all domestic uses].

Moreover, while the estimated energy cost of using grid energy under the above approach is approximately Rs 17,500-29,940 crore annually, the study shows that using renewable energy would cost around Rs 10,900-11,700 crore per year—a reduction of 40 to 60 per cent.

Need for nurturing mechanisms

Despite the tremendous potential of green energy, it can do only so much, and for so long, unless embedded in a supportive ecosystem. Strong conservation and recycling efforts like rainwater harvesting and greywater treatment, therefore, must be undertaken simultaneously, complemented by strict government guidelines, appropriate infrastructure, and collective policies for encouraging pro-environment behaviour.

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