Drawing insights from the piloting of climate adaptive urban water supply management in the Himalayan cities of Nepal

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Cities in the Himalayas face a situation of water stress amidst the reports of the declining flow of traditional local sources such as streams and springs, shifting trends of seasonal flow patterns, and a longer duration of dryness. However, the key drivers behind the widening supply gap are reported to be the rapid and unplanned urbanization and management efficiency of supply systems. In absence of locally tested policy and technological solutions to address the burning issues of meeting water supply needs and sustaining the sources, a pilot study was conducted in two cities of the Nepal Himalaya - Dharan and Dhulikhel under a framework called climate adaptive and equitable water management practices (CAEWMP). Under the CAEWMP framework, a participatory approach was followed to design and construct climate-adaptive recharge pits (CARP) in the two cities. In order to accommodate the local needs and priorities, the design of rainwater harvesting systems for groundwater recharge was kept flexible. Over the 3 years of study and piloting of the CARP, it revealed that the respective communities in the municipalities found the approach effective to intercept the surface runoff following each rainstorm. The pits, however, were designed differently in the two towns. In Dhulikhel, a network of 50 ponds was built in the local forest while in Dharan, the rooftop of private homes was used tap rainwater to recharge local springs and groundwater respectively. The effectiveness of CARPs to augment the springs and groundwater, however, is still a subject of investigation due to the paucity of data. Nevertheless, the significance of using rainwater in the Himalayan mountain has three aspects – first, mountain cities that depend on local springs sources for water supply are switching to tap deeper groundwater using advanced drilling technologies, second, the climate variability trends suggest declining volume and duration of rainfalls that would adversely affect the availability of rainwater to recharge groundwater, and, third, the ever-increasing water demand of cities was driven by thriving tourism and other businesses. In this study, we analyzed city-specific temperature and precipitation trends of Dharan and Dhulikhel with 30 years from local stations, and, the estimated potential contribution of different types of CARP to recharge groundwater for each. The results indicated that the CARP approach can be a viable option that can contribute towards making groundwater and local springs sustainable with low-cost interventions by tapping rainwater.

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