

Reliability of Citizen Science-Based Rainfall Monitoring in the Kathmandu Valley

Abstract—In the Kathmandu Valley, monsoonal rainfall is often regarded as an indispensable source of water that recharges streams, groundwater, lakes, and ponds. The rainfall amount is highly influenced by the topography and climate, so it varies both spatially and temporally. Along with the swift population growth and unplanned urbanization, the rainfall extremes also are inducing several hazards including floods that result in loss of lives and impedes socio-economic development. Therefore, rainfall monitoring is important to understand the spatial and temporal distribution of the rainfall to support wise water management decisions. In resource-constrained countries like Nepal, the citizen science approach can be a pertinent option to generate hydro-meteorological data. Hence, S4W-Nepal mobilizing Citizen Scientists (CS) to generate rainfall data with the help of a cost-effective S4W rain gauge and an android mobile application called 'ODK Collect'. This study aims to determine the reliability of citizen scientists' rainfall data in comparison with the Department of Hydrology and Meteorology (DHM) rainfall data. The results showed that the average data error percentage of the CS was 13.32 %. The correlation between nine co-located stations was found to be strong (above 0.6), 4 co-located stations were moderate (between 0.4 - 0.59), and 2 co-located stations were weak (below 0.39). Only 2 out of 15 co-located stations were not statistically significant. The results show the potential application of the citizen science approach in data-scarce countries like Nepal.

Keywords—*Rainfall, Citizen Scientists, Kathmandu Valley*