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Rooftop rainwater harvesting for recharging shallow groundwater

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Water management is very critical for the growth and development of any economy, more so in a developing countries like India. However, resource is now under stress, because of excessive groundwater abstraction in the course of socioeconomic development and meeting increasing needs of growing population. Therefore, we need to conserve this precious resource while benefiting from it. The prime objective of the study is to identify the potentiality of rainwater for recharging shallow groundwater in the Jawaharlal Nehru Technological University Hyderabad, Kukatpally campus. Normal annual rainfall in the study area is 821mm with unutilized non-committed surplus monsoon runoff. Artificial recharge of ground water through rooftop rainwater harvesting was done by constructing three recharge structures each with a capacity of 1,00,000 litres at different places in the study area with two recharge shafts for injecting rainwater into unconfined and confined aquifer system. Three measuring bore wells (piezometers) with a diameter of 6” were dug upto a depth of 30 m near the recharge structures for impact assessment studies. Water levels measured in the three bore wells on daily basis during the monsoon period were found to be 86.3, 90.2, 38.3 ft on 15th June 2012 before rainwater recharge and the corresponding water levels have been improved to 50.7, 56.5, 10.3 ft respectively on 1st October 2012 due to recharge of rainwater. A corresponding rise of 35.6, 33.7, 28.0 ft in groundwater levels has been registered indicating significant improvement of groundwater levels. Rainfall received during the years 2012 and 2013 is 774 and 1104 mm respectively. Total amount of surplus rainwater received during 2012 is 7, 11, 174, 8, 93, 849 and 4, 74, 814 liters recharged near Near Library, Near Girls Hostel and Near New IST respectively. Total amount of surplus rainwater received during 2013 is 10, 13, 563, 12, 73, 911 and 6, 76, 703 liters recharged near Near Library, Near Girls Hostel and Near New IST respectively. A total rainfall of 774 and 1104 mm has been found to be recorded and a total quantity of 50, 44, 013 liters of groundwater has been found to be recharged during the years 2012 and 2013 years respectively.

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