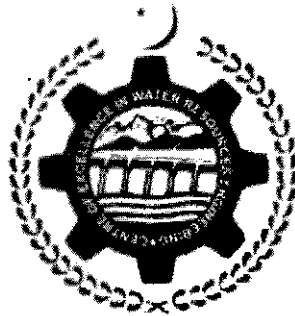


**GROUNDWATER MODELING FOR  
PERFORMANCE EVALUATION OF RECHARGING  
WELL**



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## ABSTRACT

Lahore being second largest city of Pakistan solely rely on groundwater reserves for domestic, commercial & industrial purposes. Higher abstraction rates to meet increasing demands are continuously depleting the ground water table. The abstraction rate of groundwater in Lahore has increased to 784 MGD (41.23 cumecs) in 2010 from 44.6 MGD (2.35 cumecs) in 1960. Now a days many Managed Aquifer Recharge (MAR) techniques are being used to decrease the groundwater depletion rates like infiltration galleries, and recharging wells etc. Pakistan Council of Research for Water Resources (PCRWR) has recently installed one recharging well at their regional office in Lahore, whose inflows and piezometric data are collected as flowmeter and piezometer was installed by the PCRWR. This research aims assessment of groundwater recharge around the recharging well in order to predict the future trend that how much it contributes to aquifer. Setting up of groundwater flow model was carried out for the recharging well installed at PCRWR regional office Lahore using the software Visual MODFLOW. The model was calibrated for 1<sup>st</sup> January 2017 - 31<sup>st</sup> December 2017 and validated for 1<sup>st</sup> January 2018 - 31<sup>st</sup> December 2018 using observed data. It was observed that ground water table is depleted by 1.2m for the year 2017-2018 after the installation of recharging well. For long term performance evaluation hypothetical scenario modeling was carried out using 17 years rainfall data to predict groundwater levels for next five years (2018-2023). The difference in groundwater table depths with and without recharging well situation is about 2.8 m. Water table depth was found to be 192.5 m with recharging well and 195.3 m without recharging well. The study shows that if the same urban development trends prolong, it will render groundwater system unsustainable as the groundwater recharging sources more or less remain at the same level while the abstraction rates continue to increase day by day.

The gap between inflow and outflow is continuously increasing which is resulting in the depletion of groundwater storage. To overcome such rapid decline of water table, there should be rain water harvesting through recharging wells in Lahore city. The current study highlights the importance of groundwater refueling by series of recharging wells in order to minimize Lahore's water depletion rate.