GROUNDWATER MODELING FOR DIFFERENT ALTERNATIVES OF AQUIFER RECHARGE

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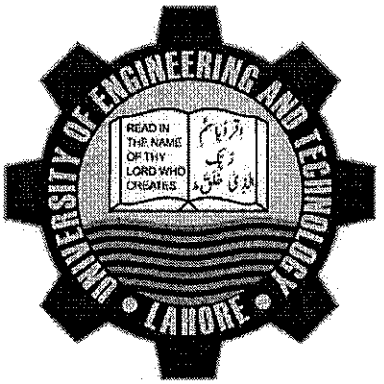

by

Bisma Akmal
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Research Supervisor:
Dr. Ghulam Nabi

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Centre of Excellence in Water Resources Engineering

University of Engineering and Technology, Lahore

ABSTRACT

Sustainability of the globe is threatened by the growing water issues. Water use has increased with the population increase which led toward water scarcity across the globe. Population in Pakistan has gone over 200 million. The country is facing water issues because of rapid increase in population, increasing industrialization and urbanization. Groundwater plays an important role to meet with the demands for domestic, agriculture, urban and industrial purpose in Lahore. Due to continuous increase in population and people moving towards the urbanized areas causes the extra groundwater extraction results in depletion of aquifer. The growing water demand in regions has resulted and demanded high water management measures to allow more effective use of the limited water supplies. The natural groundwater replenishment happens slowly. If groundwater is utilized a proportion higher than its recovery, this would result in water level loss and groundwater resource depletion in long term. In many countries, artificial recharge of groundwater is becoming necessary to optimize natural recharging of groundwater supplies. Different techniques are presented depending on specific condition. These techniques have been evaluated and compared with other recharging techniques with respect to their effectiveness and their impacts on ground water recharge. In this study rainfall runoff relationship was developed by using hydrological model. The study area and observation well shapefile was prepared by using google earth and GIS after geo-referencing observation well data was imported to Visual Modflow. Lowest elevation points were located, taken as recharging points and water being recharged through Infiltration galleries. Recharging wells were also added in model to compare results with the result of infiltration gallery. Performance of infiltration gallery was observed

better than recharging wells. Average depletion rate in study area was 0.9 m/year. The data showed groundwater levels were at 218m. The model showed ground water level was at 220m for infiltrations gallery, recharged at the rate of 2m on annual basis, whereas the groundwater level was at 219m for recharging well. This study showed if daily 0.087 m/day water is infiltrated through these infiltration galleries then water level can be maintained. The impact of recharging techniques in groundwater was evaluated using groundwater modeling software Visual Modflow.