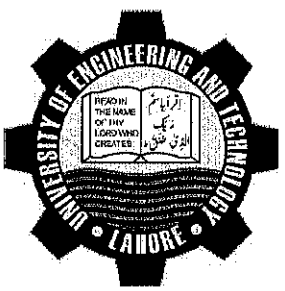
ASSESSMENT OF GROUNDWATER RECHARGE POTENTIAL AND RECHARGE ZONES IN PUNJAB, PAKISTAN



by

Muhammad Afzal
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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

Groundwater is the most valuable natural resource that plays a vital role in all aspects of life. Pakistan is an agriculture country and about 80% water is used for agriculture. Due to increase population and cropping intensity water demand has increased. Surface flows are reducing and groundwater is used to fulfill the need of crop growth. Due to this, Punjab is currently experiencing groundwater stress. Groundwater is declining day by day due to over abstraction and with less aquifer recharge. Better management practices and artificial recharge is needed for sustainable groundwater resources. The aim of this study was to delineate and classify the groundwater recharge capacity and recharge zones using GIS and RS. Nine multi-influencing parameters such as rainfall, geology, soil, land use land cover, lineaments, slope, topographic wetness index, aspect and drainage density were used to estimate the groundwater recharge capacity. Thematic map of all these parameters were generated using Landsat ETM data. The multilayers reclassification was done based on previous studies and the parameter weights were assigned according to Saatty's scale in AHP. The piezometric data analysis showed that out of 2350 piezometer, 1790 piezometer showed a decline in water level and 560 piezometer showed a rise in water level. The parametric analysis showed that the rainfall was the most influential factor and had weightage of 22.84%. The groundwater recharged capacity map was classified into five categories. The result showed that 3.02%, 46.76%, 22.63%, 22.17% and 5.43% areas were suitable for least, low, moderate, good and high groundwater recharge capacity zone respectively. The results were validated by the reservoir operation curve and show 0.71 correlation with groundwater recharge capacity map. The map developed for recharge capacity can be used as base line to carry out groundwater recharge activities in Punjab.