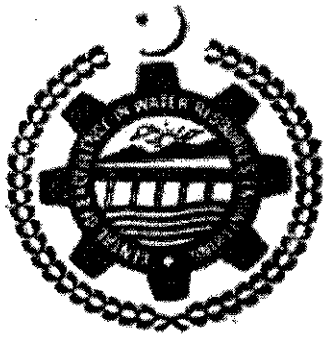
THESIS

SUSTAINABLE GROUNDWATER POTENTIAL OF MADINA DISTRIBUTARY OF MULTAN BRANCH CANAL



By

MUHAMMAD AMJAD
(2010-PG-WRM-46)

For the Degree of

MASTER OF SCIENCE

IN

WATER RESOURCES MANAGEMENT

CENTRE OF EXCELLENCE IN WATER RESOURCES ENGINEERING
University of Engineering and Technology, Lahore-Pakistan

2013

ABSTRACT

Understanding the importance of groundwater resources and its growing demand makes it pertinent to search for effective strategies for properly managing the resource. The research was conducted to settle on a sustainable groundwater potential so that groundwater abstraction in the area in future might not be affected. For this purpose, all the components of inflow and outflow from groundwater of the area were assessed. Components of recharge to groundwater included rainfall and seepage (from irrigation water conveyance channels and irrigated lands) while discharge from groundwater was mainly due to a number of tube wells working in the area. To quantify the storage (positive or negative) to groundwater and to study the aquifer behavior, inflow and outflow data was taken as input to MODFLOW, a three dimensional finite-difference groundwater model.

Input data was processed by MODFLOW and resulting hydraulic heads were calibrated with the observed values of water table fluctuations for previous five years i.e. 2006-10. Calibrated results were used to simulate the model for further ten years period of 2011-20. The simulation results helped to predict aquifer behavior in future. Model was then run at lower abstraction rates to decrease the depth to water table to a sustainable level. The results were extended to determine a sustainable abstraction rate for further ten years period. At the end, it was concluded that abstracting groundwater at rates lower than present abstraction rate (116,000 m^3/day) is expected to elevate the groundwater table to a sustainable depth of around 10 m. Moreover, after attaining a sustainable depth to water table, groundwater should be abstracted at a rate of 112,000 m^3/day to maintain the water table to sustainable level.