

Estimating groundwater recharge using empirical method: a case study in tropical zone

Abstract

Estimation and forecast of groundwater recharge and capacity of aquifer are essential issues in water resources investigation. In the current research, groundwater recharge, recharge coefficient and effective rainfall were determined through a case study using empirical methods applicable to the tropical zones. The related climatological data between January 2000 and December 2010 were collected in Selangor, Malaysia. The results showed that groundwater recharge was 326.39 mm per year, effective precipitation was 1807.97 mm per year and recharge coefficient was 18% for the study area. In summary, the precipitation converted to recharge, surface runoff and evapotranspiration are 12, 32 and 56% of rainfall, respectively. Correlation between climatic parameters and groundwater recharge showed positive and negative relationships. The highest correlation was found between precipitation and recharge. Linear multiple regressions between recharge and measured climatologic data proved significant relationship between recharge and rainfall and wind speed. It was also proven that the proposed model provided an accurate estimation for similar projects.

Keyword: Effective rainfall; Groundwater recharge; Recharge coefficient; Tropical zone