FIELD APPLICATION OF A DYNAMIC POTENTIAL GROUNDWATER RECHARGE SIMULATION MODEL FOR SMALL RECHARGE PONDS

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ABSTRACT. *Application of a dynamic potential groundwater recharge simulation (DPGRS) model for predicting potential groundwater recharge from small ponds is demonstrated. The DPGRS model includes rainfall, runoff, surface water evaporation, outflow, and depth of ponding as external inputs. The model also considered saturated hydraulic conductivity and fillable porosity of pond's bed material as its parameters. The DPGRS model is successfully applied with 3 years (2006-2008) field data from two small recharge ponds located over a watershed in a semi-arid region of India. Response of the DPGRS model is found promising for simulating potential recharge from small recharge ponds. Analyzed results showed that on average 83.0% to 90.2% of accumulated runoffs in the selected ponds contributed to artificial recharge into aquifer underneath ponds. Evaporation losses varied from 7.7% to 9.2% of stored runoffs. Surplus flows from the ponds and stored runoffs in ponds at the end of simulation periods ranged, respectively, from 0 to 8.3%; and 0.6% to 0.8%. The predictions of the DPGRS model are found to be comparable to the rigorous numerical solution of the Richards model (HYDRUS-1D). These results are, however, site specific and may vary with hydro-climatic condition of location, size of recharge pond, and pond's bed soil parameters. An additional calibration and validation of the DPGRS model with field observed data in varied climatic and hydrological conditions would be conducted to increase the applicability and credibility of the model.*

Keywords. *Artificial groundwater recharge, Field application, India, Pond, Simulation model, Water balance.*