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The Thesis Submitted for the Degree of M. Sc
In the field of Watershed Management

The Effect of Pondering Crests on the Quantity and Quality of Groundwater in Gohar Kouh Plain

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Abstract:

Groundwater harvesting is one of the ways to supply water in arid and semi-arid regions. Excessive harvesting of these resources and natural disasters, including drought, have a negative impact on the quantity and quality of water in many ways. Construction of crescent-shaped pond is one of the water management strategies in arid and semi-arid regions that can have a positive impact on improving the quantity and quality of groundwater resources. The purpose of this study was to investigate the effect of crescent-shaped ponds on the groundwater aquifers in Gohar Kouh plain located in Khash city of Sistan and Baluchestan province. To study the aquifer water level, statistics of 14 observational piezometeric well that located in the plain from 1381 to 1396 was used, and the water tables level was investigated after (96-1389) and before (87-1381) the construction of the crescent-shaped ponds. Finally, using Arc GIS 10.4.1 software capabilities, the plain index-hydrograph was createded for two periods using Thyssen grid method. Also, to study the aquifer water quality parameteres, the values of SAR, EC, TH, PH, TDS, Na+, Mg++, So4-, Cl- and Ca++ were sampled from 12 qualitative observational piezometeric well during the two statistical periods and the maps of all quality parameters were created. To evaluate the groundwater usages of the plain for potable and agricultural purposes Scholer and Wilcox diagrams were used, respectively. Also, T-test was used to compare the mean water level and water quality parameters in the pre- and post-construction periods and the water quality results were determined for drinking and agricultural purposes. The results of dependent T test showed that there was a significant difference between all the qualitative indices except PH, SAR and HCO3 in this study. This difference between the qualitative indxes indicates the performance of crescent-shaped structures, reduction of rainfall and excessive use of groundwater in the statistical period. Because the decrease in the depth of groundwater despite the construction of crescent structures, has caused a significant difference between the qualitative indexes.

Key words: Artificial Recharge, Groundwater Quality, Crescent-shaped Pond, Schuler, Wilcox, Gohar Kouh, GIS