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TEN-YEAR CHANGE AND POSSIBLE SCENARIOS IN THE DEEP AQUIFER OF THE HARRAN PLAIN, TURKEY

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Abstract

The sustainability of groundwater resources, which is an important source of drinking and irrigation water, requires regular monitoring. Since the Harran plain has been opened for irrigation, it has been under the pressure of intensive gravity (wild) irrigation and urbanization where the largest groundwater resource in the Middle East exists. This research aimed to define the changes in some groundwater pollutants which are electrical conductivity (EC) and nitrate (NO_3^-) for ten years (2009-2019) in the deep aquifer of Harran Plain. A comparison of the seasonal and annual average values revealed increases, in EC by 12.1% and NO_3^- by 1.6% respectively. Over the ten years, the changes in these data are not statistically significant and have indicated that there is no risky situation if these waters are used in agricultural irrigation. Although these results are remarkable, the increasing rates of both values are thought-provoking and reveal the necessity of taking precautions. Based on the crop pattern of 2019, it has been calculated that if the EC threshold value is exceeded by 1%, a yield loss of 2.58% will occur. Accordingly, the loss value of agricultural production will be \$9.272 million for the entire Harran Plain. The food crisis, which is experienced all over the world due to climate change, war, pandemics and other environmental problems, has made it necessary to carry out these studies. However, it is recommended that similar studies be carried out for other agricultural areas as well. This research is the first of its kind.

Key words: deep aquifer, electrical conductivity, groundwater quality, irrigation, nitrate, Harran Plain

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