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Abstract

Today, the necessity of quantitative and qualitative monitoring of underground water is inevitable. In this research, the process of changes in water table level and quality of underground water in Rask Plain was investigated with the help of Matlab and ArcMap software in the period from 1384 to 1399, using Shuler water quality classification methods. and Wilcox, the appropriateness of water sources for drinking and agriculture has been determined. The quality of underground water of the plain, respectively, for drinking, with Schuler's diagram, in the medium group; And for agricultural purposes, with the Wilcox diagram, it was placed in the light soil class and, with the Piper diagram, it was placed in the chlorate Sedic class. Examination of quality indicators showed that water quality has decreased over time. Also, the results showed that the Pirdan station with a flow rate of 54 liters per second in 1385 had the highest flow rate and the Bregenzdan station with a flow rate of 20 liters per second in 1398 showed the lowest flow rate among the studied stations. The overall conclusion of this study shows that cropping patterns in the Pishin Plain have significant impacts on water quality and pollution levels. The geographical location of extraction wells and their density in various parts of the plain influence groundwater withdrawal and, consequently, the chemical characteristics of water resources. In areas with higher well density (especially in the east and southeast), increased water extraction has led to noticeable changes in water chemistry and pollution levels. Additionally, the use of fertilizers and nutrients, particularly in farms close to the wells, has had direct and significant effects on pollutant concentrations in water resources. In areas where diverse crops such as mango, wheat, onion, and alfalfa are grown, the pollution levels in water resources are significantly higher compared to the surrounding regions. One of the key findings of this study is the significant impact of "Ziziphus" (Sidr) cultivation on the increase in sulfate levels in water resources. In region 1, where Ziziphus is cultivated, sulfate levels were notably higher than in other areas. This rise in sulfate can cause substantial chemical changes in water resources, ultimately leading to a decrease in the quality of drinking water. Other pollutants, such as calcium, magnesium, and potassium, have also shown changes in their concentrations across different areas based on cropping patterns and the use of chemical fertilizers, which can affect the quality of water and its utilization.

Keywords: Underground water quality, Cultivation pattern, Qualitative and quantitative parameters, GIS, Rask Plain