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**Title**

# **Zoning of heavy metals concentration in water of wells along the Sistan River**

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## **Abstract**

The main activity of the people in Sistan region, is agriculture and animal husbandry, which due to the drought and the unavailability of surface water and the intermittent flow of water in the Sistan River, the digging of irrigation wells has expanded in this area. However, until now, the concentration of heavy metals in the water wells has not been investigated and only the salinity factor has been considered from the point of view of water quality. Therefore, in this research, in order to ensure the appropriate quality of water for agriculture, animal husbandry and aquaculture in terms of the concentration of heavy metals and also the possible effect of EC and pH factors on their changes, the concentration of some elements and factors mentioned in the water samples of 26 active wells was measured along the Sistan River (with a maximum distance of 1000 meters buffer zone) from the border point to the entrance to Hamoon Hirmand (Afzal-Abad branch, Lorg Bagh and Khwaje mountain). According to the investigation of the Afzal-Abad branch and the absence of wells, no samples were obtained from this section. The obtained results were zoned using the normal kriging and co-kriging methods based on the selected model resulting from the prediction standard error. The results indicated a low concentration of Cadmium, Nickel, Chromium, Copper, Iron and Zinc. While Lead and strontium concentration was higher than the standard. The low concentration of the mentioned elements is due to the alkaline pH of the water, which acts as a buffer and causes the elements to become insoluble and precipitate. Some dangerous elements such as mercury could not be measured due to their low concentration. The amount of salinity and EC factors also showed that the wells water is not suitable for agriculture and livestock. The result of element zoning also showed that the concentration of metals increases from the border towards the lake. According to the age of the wells, it can be said that the reason for the decrease in the concentration of metals is due to the longer life of the wells and the chance of water mixing during the Sistan river water harvesting.

**Keywords:** water pollution, irrigation, kriging interpolation, Geo statistics.