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Adopting the Water Quality Index to assess the validity of groundwater in Al-Zubair city southern Iraq for drinking and human consumption

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ABSTRACT

Ground water is an alternative source of water in arid and semi-arid area. The present study aimed to assess the suitability of twenty well waters in Al-Zubair area, southern Iraq for drinking and human consumption. Water Quality index (WQI) was adopted to evaluate the water of the studied wells. Water Quality Index (WQI) was calculated depending on a fifteen physiochemical parameter including: pH, Total dissolved solids (TDS), Calcium (Ca^{+2}), Magnesium (Mg^{+2}), Chloride (Cl^{-}), Sulphate (SO_4^{-2}), Nitrate (NO_3^{-}), Sodium (Na^{+}), Potassium (K^{+}), Lead (Pb^{+2}), Cadmium (Cd^{+2}), Copper (Cu^{+2}), Zink (Zn^{+2}). Iron (Fe^{+2}) and manganese (Mn^{+2}). Results of WQI values indicated that the wet season has the lowest average of WQI(795.6), with range values from 604 to 1274, while the dry season recorded the highest average of WQI(1372.1), with range values (878 – 2997) respectively. The WQI results indicate that groundwater is classified as unfit for drinking and human consumption purpose. This study is useful in the planning and rational management of groundwater resources and their potential for use as drinking water.

Key words : *Ground water, Al- Zubair, Physiochemical parameters, WQI*

Introduction

Worldwide, freshwater resources are depleting as a result of population growth and industrial development. In the last two decades, global water scarcity has been evident in Iraq as a result of the degradation of its freshwater source (Tigris and Euphrates) (Alwan *et al.,* 2019). The construction of several dams on the headwaters of the Tigris and Euphrates rivers by Iraq's neighbors Iran and Turkey is one of the most important reasons for the deterioration of these rivers. ('Towards Sustainable Water Resources Management In Iraq', 2018). This coincided with significant population growth and lack of infrastructure and scientific planning for water resources management in the country. Iraq's location in the Middle East, one of the regions most affected by climate change (low rainfall, increased evaporation levels, rising the level of sea and drought) is an important factor in water scarcity. For these reasons the Iraq's freshwater resources becomes not meeting the overall needs. The consequences were numerous and had a adverse effect on facilities such as agriculture, industry, tourism and energy, leading to increased unemployment, poverty, food insecurity and malnutrition. Recently, the global trend towards groundwater has become a substitute for surface water as an important natural water resource, groundwater has many advantages making it better used "compared" to surface water 1. It's of higher