

# **The Development of Groundwater Risk Index through Multiple Dataset in the Arabian Basin, Saudi Arabia**

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## **Abstract**

Global groundwater resources have been threatened by both climate change and anthropogenic activities. Both factors could lead to groundwater depletion that might increase serious threat to living environment and food security. As one of the world's most water-stressed country, Saudi Arabia has experienced long term of groundwater depletion due to excessive groundwater pumping to meet the irrigation water demand. Moreover, rainfall and groundwater recharge are considered very low in most places in the Kingdom. Hence, a comprehensive assessment of groundwater vulnerability in Saudi Arabia is necessary to avoid worse scenario. This study used the composite index to evaluate the groundwater risk in the Arabian Basin, Saudi Arabia. Numerous variables, such as groundwater storage variations, groundwater reserves, irrigated area, and development of cultivated area were integrated to achieve the objective. The integration between physical hydrological assessment and anthropogenic factors is assumed to be holistic approach to determine how vulnerable one area is compared to other areas. Results showed that Najran is considered as the lowest risk area in terms of groundwater vulnerability, while the highest risk area is located in Qassim. This study could serve as a diagnostic tool for decision-makers to prioritize and develop sustainable schemes, especially in high-risk areas.