

# **Water resources management and sustainability over the Western desert of Iraq**

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## **Abstract**

In this research, a comprehensive survey of water resources management and sustainability was conducted over the Western desert of Iraq. A modeling was performed using both remote sensing and numerical analytical tools. Field measurements of hydrological and hydrogeological variables were used to assess surface and groundwater resources. The watershed modeling system was used to identify the existing ponds in the region and to determine their topographical and geometric characteristics based on the digital elevation models. In this study, an annual water harvesting rate was determined for each basin of the studied area, and the annual rate of all the ponds was about 8000 m<sup>3</sup> /km<sup>2</sup> . New prominent areas were identified in the field of water harvesting in which water can be exploited for various agricultural uses and the establishment of communities. The second part of water resources is groundwater resources where the amount of renewable and non-renewable groundwater in the region was estimated at more than 30 billion cubic meters. The maps obtained from the Geological Survey were used to identify important groundwater aquifers in the region and to prepare a table of promising areas for investment in future strategic projects. A group of preferred areas was identified as part of the medium-term investment plan for different uses and for safe extraction of groundwater around the province at an approximate annual rate of a billion cubic meter which is equal to the annual recharge rate of groundwater..