Abstract—Remote sensing and GIS-based techniques were used to select the potential sites for water harvesting in Salah Al-Din Governorate, northern Baghdad/ Iraq. Spatial Multi-Criteria Evaluation (MCE) was used where seven criteria layers have been evaluated to identify water-harvesting sites, such as slope, stream order, precipitation, potential evaporation rate, soil type, distance to roads and the Normalized Difference Vegetation Index (NDVI). This method helps in locating water-harvesting sites in suitable places as well as improves the management of water resources in the study area. Fuzzy logic modeling was used to standardize the criteria layers, and the Fuzzy Gamma overlay was used to combine these layers together in ArcGIS 10.5. Specific criteria were used to unify all these layers. Finally, the final suitability map for the potential water harvesting sites in Salah Al-Din area was produced were twelve potential water-harvesting sites within the study area have been identified according to the specific criteria used for this purpose and have a high potential for water harvesting. This map will provide optimum sites to build dams in order to store the water, especially in drought-stricken areas. The results illustrate that the GIS can be used as a decision-making tool in water resources management in a scientific approach, which makes the decision making easier and accurate.

Keywords—Fuzzy Logic, GIS Models, MCE, Remote Sensing, Water-harvesting.