



## Using GIS and Remote Sensing Techniques for Delineation of Groundwater Potential Zones - A Case Study of the Titel Municipality, Serbia

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Dramatic population growth and climate change lead to an increasing demand for groundwater resources. According to *The 2018 edition of the United Nations World Water Development Report*, nearly 6 billion people will face severe water scarcity by 2050. Groundwater represents the world's largest available freshwater resource and it is essential for domestic purpose, industrial, and agricultural uses. Therefore, it is very important to identify the potential locations for new groundwater zones development. Here, we utilized geographic information system (GIS) and remote sensing (RS) techniques for the delineation of groundwater potential zones in the Titel Municipality, located in the Autonomous Province of Vojvodina. The groundwater in the study area is affected by elevation difference, agricultural production, and its geographical position. Titel Municipality has a very good agriculture potential that can be only fully exploited by improving groundwater management. Considering that, for the delineation of groundwater potential zones we prepared 6 thematic layers such as geology, geomorphology, land use/land cover, soil, drainage density, and slope. According to their relevant importance in groundwater occurrence, all layers and their features were assigned weights using the Saaty's scale. Weights of layers were normalized using analytical hierarchical process techniques (AHP). Finally, layers were integrated and overlaid using QGIS software for generating the Groundwater Potential Zone (GWPZ) map of the study area. As a result, the groundwater potential zones in the Titel Municipality were characterized and classified into five classes as *very good* (7.13%), *good* (35.44%), *moderate* (21.27%), *poor* (31.41%) and *very poor* (3.11%). With these techniques, we showed that *very good* and *good* groundwater zones are predominantly located in the alluvial plain and the lower river terrace, while *poor* zones mostly evident on the landform of the loess plateau and artificial surface. The GWPZ map will serve as a useful guide for sustainable management and utilization of the region as well as to improve the irrigation facility and develop the agriculture productivity of the area.