COMPARISON BETWEEN THE PRODUCTIVITY OF TUBULAR WELLS DRILLED INSIDE AND OUTSIDE KARSTIC DEPRESSIONS IN THE EPA KARST REGION OF LAGOA SANTA – MG

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ABSTRACT: The research area of approximately 505 km² extends from the municipalities of Vespasiano and Lagoa Santa, in the south, to Funilândia, in the north, encompassing the entire Environmental Protection Area of the Karst of Lagoa Santa and its surroundings, and is geologically composed of carbonate rocks and metapelites of the Bambuí group. Due to the low number of surface watercourses, the drilling of tubular wells to collect groundwater becomes an important solution for local supply. Thus, this study aims to present a comparison between the productivity of wells located inside or outside karstic depressions, without discussing the limits for drilling wells inside these structures according to good environmental practices. To this end, this study used the 393 karstic depressions detected using geoprocessing techniques in a Digital Elevation Model, and the specific capacity values (Q/s) (m³/h/m) of the 264 tubular wells registered in the Groundwater Information System (SIAGAS) present in the area. From the 264 wells, 75 of them are registered within 24 depressions while the other 189 wells are outside these depressions. With these data in hand, it was determined that the median (Q/s) of the wells located inside the karstic depressions is 2.00, and for the wells outside them it is 0.53. When comparing the number of wells inside and outside the depressions in frequency ranges (Q/s), it can be seen that: the (Q/s) range less than 0.5 corresponds to 26.0% of the wells located inside the depressions and 48.6% of wells outside; the (Q/s) range between 0.5 and 1.0 represents 13.0% of the wells inside the depressions and 8.5% of the wells outside; the (Q/s) range between 1.0 and 3.0 comprises 20.3% of the wells inside the depressions and 14.1% of the wells outside; the (Q/s) range between 3.0 and 5.0 corresponds to 11.6% of the wells inside the depressions and 4.0% of the wells outside the depressions; and, finally, the (Q/s) range greater than 5.0 comprises 30.0% of the wells inside the depressions and 24.9% of the wells outside the depressions. It is noticed that from the value of (Q/s) greater than 5.0, the wells may be related to the most karstified region, being related to conduits, while for values less than this, the wells can be related to less karstified regions. The higher productivity of wells drilled inside karstic depressions rather than tubular wells drilled outside them is explained by the fact that these karstic features behave as carbonate aquifers recharge areas, highlighting the greater favorability of karstic depressions for more productive wells.

KEYWORDS: Groundwater management, Karst of Lagoa Santa EPA, Sinkholes.