ABSTRACT

The development of the population in the Gombong District and its surroundings is increasing quite rapidly. This development will be in line with the increasing demand for clean water. The increasing need for clean water requires protection and supervision of groundwater, more precisely groundwater management that ensures the availability of groundwater sustainably and can be used within a predetermined and calculated time. Based on these problems, it is necessary to conduct a study on the vulnerability of groundwater to pollution. This study aims to determine the zoning of groundwater vulnerability to pollution, determine the potential hazard of groundwater pollution in the study area based on the vulnerability of groundwater and groundwater pollutant sources, and determine the most appropriate method of determining vulnerability to determine the hazard of contaminants in the study area based on the DRASTIC method. , and Hoelting Method. This research was conducted over a period of 5 months, starting from January to May 2022. The data collection involved observing dug wells, taking groundwater samples, taking rock samples, and measuring the resistivity values of rocks in the study area. Activities carried out after data collection, namely the process of data analysis including analysis of groundwater samples to determine the content of chloride, nitrate, and TOC values as reference materials for validation, preparation of groundwater vulnerability maps based on the DRASTIC method and the Hoelting method, and preparation of groundwater contamination hazard maps based on the results of contaminant loads and the level of vulnerability of groundwater, then carry out validation to determine the appropriate vulnerability method to be used in the study area. Groundwater vulnerability based on the DRASTIC method can be categorized into 2 zones based on the DRASTIC Index value, namely moderate groundwater vulnerability with a DI value of 106 – 146, and high groundwater vulnerability level with a DI value of 146 – 186. Groundwater vulnerability based on the Hoelting method can be divided into 3 based on the level of overall protection effectiveness, namely moderate (3 – 10 years), low (a few months – 3 years), and very low (a few days to one year, in karst rocks it can be more or less). Based on the groundwater susceptibility values of the two methods, the hazard of contamination of groundwater to chloride, nitrate, and TOC contaminants based on the DRASTIC method can be divided into 3 zones, moderate, moderately high, and high. Meanwhile, for the Hoelting method, the hazard of groundwater contamination can be generated into 4 zones, namely moderate, moderately high, high, and extreme. Based on the results of the groundwater contamination hazard map of the two methods with the results of testing the values of the chloride, nitrate, and TOC parameters, the validation was carried out using non-parametric parameters, namely the Spearman-rho method, it resulted that the validation value of the DRASTIC method had a stronger positive correlation value than the Hoelting method.

Keywords: Gombong, groundwater vulnerability, DRASTIC method, Hoelting method, Spearman Rho validation