

## **KAJIAN BAHAYA PENCEMARAN AIR TANAH PADA SUMBER AIR SISTEM PENGELOLAAN AIR MINUM (SPAM) TOYA GAMA**

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### **SARI**

Toya Gama merupakan lembaga Sistem Pengelolaan Air Minum (SPAM) di bawah pengelolaan UGM *Residence*. Toya Gama dibuat sebagai upaya penyediaan air minum mandiri bagi civitas akademika di Universitas dari aspek air baku dan pengelolaannya. Sumber air Toya Gama yang berasal dari sumur dangkal rawan mengalami pencemaran. Kemungkinan pencemaran tersebut karena adanya aktifitas penduduk yang berada di utara sumber air tanah Toya Gama. Untuk menjaga kualitas air tanah dari pencemaran, perlu dilakukan kajian bahaya pencemaran air tanah dengan tujuan untuk: 1) menentukan zona perlindungan air tanah yang mempengaruhi sumber air tanah SPAM Toya Gama; dan 2) menentukan zona tingkat bahaya pencemaran pada zona perlindungan sumber air SPAM Toya Gama.

Metode dilakukan dengan meninjau tata guna lahan, geologi, dan hidrogeologi lokasi penelitian, kemudian menentukan zona perlindungan air tanah sumber air Toya Gama, serta kerentanan, beban kontaminan, dan bahaya pencemaran dari zona perlindungan tersebut. Penelitian yang telah dilakukan divalidasi dengan konsentrasi nitrat yang diambil pada 11 titik dan rasio nitrat:klorida.

Hasil penelitian menunjukkan bahwa: 1) zona perlindungan air tanah SPAM Toya Gama berada di sekitar sumur Toya Gama yang terbagi menjadi zona perlindungan dalam, luar dan wilayah tangkapan dengan luas 592.065 m<sup>2</sup>. Zona tersebut berbentuk elipsoidal dengan batas jarak dari sumur ke utara 1.210 meter, ke selatan 80 meter, dan lebar maksimal 570 meter yang berada 860 meter di utara sumur; 2) bahaya pencemaran air tanah pada zona perlindungan sumber air SPAM Toya Gama memiliki nilai kualitatif moderat-rendah, moderat, moderat-tinggi, dan tinggi dari matriks antara kerentanan air tanah dan beban kontaminan. Oleh karena itu, pengelola SPAM Toya Gama perlu melakukan konservasi sumber air Toya Gama karena konsentrasi nitrat pada zona perlindungan semakin lama akan semakin bertambah serta dilakukan penelitian lebih lanjut terhadap sumber air dari Umbul Telaga, sehingga Umbul Telaga bisa menjadi opsi sumber air bagi Toya Gama karena air pada Umbul Telaga UGM memiliki konsentrasi nitrat yang sangat rendah.

kata kunci: perlindungan air tanah; bahaya pencemaran; Toya Gama; air tanah

## GROUND WATER CONTAMINATION STUDY ON WATER RESOURCE OF DINKING WATER MANAGEMENT SYSTEM TOYA GAMA

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### ABSTRACT

*Toya Gama is an institution of the Drinking Water Supply System (SPAM) under the management of UGM Residence. Toya Gama was made as an effort to provide independent drinking water for the academic community at UGM from the aspect of raw water and its management. However, Toya Gama water sources from shallow groundwater are high potentially polluted. The possibility of pollution is due to the activities of the people who are in the northern part of the Toya Gama water source. To maintain groundwater quality from pollution, it is necessary to study the dangers of groundwater pollution with the aim of: 1) determining groundwater protection zones that affect Toya Gama groundwater sources; and 2) determine the pollution hazard zone in the Toya Gama water source protection zone.*

*The method is carried out by reviewing the land use, geology, and hydrogeology of the research location, then determining the Toya Gama water source groundwater protection zone, as well as the vulnerability, contaminant load, and the threat of damping from the protection zone. The research has been validated with nitrate concentration taken at 11 points and the ratio of nitrate: chloride.*

*The results of this study are: 1) Toya Gama groundwater protection zone is located around the Toya Gama well which is divided into inner, outer and catchment zones with an area of 592,065 m<sup>2</sup>. The zone is in the form of ellipsoidal with a distance limit from the well to the north of 1,190 meters, to the south 80 meters, and a maximum width of 570 meters which is 860 meters north of the well; 2) the danger of groundwater contamination in the Toya Gama water source protection zone has a moderate low, moderate, moderate-high, and high qualitative value.; and 3) Umbul Telaga UGM water source is estimated come from a different source from the surrounding area, this is based on the anomaly concentration found in Umbul Telaga compared to the concentration of nitrate at other points in the Toya Gama groundwater protection zone. Toya Gama SPAM managers need to conserve water sources because the concentration of nintrat in the protection zone will increase and the further research will be carried out on water sources from the Umbul Telaga, so that Umbul Telaga can be a source of water for Toya Gama UGM has a very low nitrate concentration.*

**Keywords:** *groundwater protection; groundwater contamination; Toya Gama; groundwater*