

**KAJIAN KERENTANAN AIR BAWAH TANAH DAN AIR PERMUKAAN
TERHADAP PENCEMARAN LIMBAH CAIR
KEGIATAN INDUSTRI TAHU DAN PETERNAKAN BABI
DI DESA NGESTIHARJO, KECAMATAN KASIHAN
KABUPATEN BANTUL, DAERAH ISTIMEWA YOGYAKARTA**

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INTISARI

Seluruh kegiatan manusia akan menghasilkan entropi seperti halnya industri tahu dan peternakan babi di Desa Ngestiharjo yang menghasilkan limbah padat dan cair yang dapat meningkatkan risiko pencemaran air bawah tanah akibat infiltrasi limbah cair dan pencemaran air permukaan dari aktivitas pembuangan limbah cair ke lingkungan. Perlindungan sumber daya air bawah tanah dan air permukaan menjadi sangat penting mengingat kebergantungan masyarakat Desa Ngestiharjo terhadap fungsi air tersebut. Pembuatan zonasi kerentanan air bawah tanah dan air permukaan sebagai bentuk usaha untuk melindungi sumber daya air dari potensi pencemaran. Penelitian ini bertujuan untuk mengetahui kualitas air limbah industri tahu dan peternakan babi serta status mutu air bawah tanah dan air permukaan dan menganalisis tingkat kerentanan pencemaran air bawah tanah dan air permukaan di Desa Ngestiharjo serta membuat arahan pengelolaannya.

Penelitian ini menggunakan metode kombinasi kualitatif dan kuantitatif. Metode pengumpulan data penelitian menggunakan metode survei lapangan dan pemetaan serta uji laboratorium dengan parameter BOD, COD, TDS, TSS, Ammonia, Sulfida, Nitrat dan *Fecal Coliform*. Teknik sampling yang digunakan *purposive sampling*. Analisis dan evaluasi penelitian ini menggunakan metode DRASTIC dalam menganalisis kerentanan air bawah tanah dan PCSM untuk menganalisis kerentanan air permukaan serta metode Indeks Pencemaran untuk mengetahui status mutu air. Metode analisis deskriptif digunakan dalam evaluasi dan arahan pengelolaan dalam penelitian dalam bentuk perancangan desain IPAL Komunal *Contracted Wetland*.

Hasil penelitian menunjukkan bahwa kualitas air limbah industri tahu dan peternakan babi melebihi baku mutu limbah yang ditentukan. Nilai indeks pencemaran seluruh sampel air bawah tanah tercemar ringan dan air sungai tercemar sedang. Hasil analisis kerentanan air bawah tanah menghasilkan satu tingkat klasifikasi yaitu sangat tinggi dengan klasifikasi nilai >172 yang dipengaruhi oleh banyaknya parameter dengan nilai sejenis. Kerentanan air permukaan menghasilkan dua tingkat kerentanan yaitu rentan dan cukup rentan dengan parameter penggunaan lahan menjadi parameter yang paling berpengaruh. Arahan pengelolaan berupa rancangan IPAL Komunal *Contracted Wetland* dengan sistem sub-surface flow dan menggunakan tanaman Cattail (*Typha angustifolia*) serta waktu tinggal selama 1,54 hari.

Kata Kunci: Kerentanan air; kualitas air; DRASTIC

**STUDY OF GROUNDWATER AND SURFACE WATER VULNERABILITY
TO WASTE WATER POLLUTION OF TOFU INDUSTRY AND PIG FARMS
ACTIVITIES IN NGESTIHARJO VILLAGE, KASIHAN SUB-DISTRICT,
BANTUL REGENCY, YOGYAKARTA SPECIAL REGION**

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ABSTRACT

All human activities will produce entropy such as the tofu industry and pig farms in Ngestiharjo Village which produce solid and liquid waste which can increase the risk of groundwater pollution due to infiltration of wastewater and surface water pollution from wastewater disposal activities into the environment. Protection of groundwater resources and surface water becomes very important considering the dependence of the people of Ngestiharjo Village on the function of the water. The creation of groundwater and surface water vulnerability zoning as a form of effort to protect water resources from potential pollution. This research aims to determine the quality of wastewater from the tofu industry and pig farm as well as the status of groundwater and surface water quality and to analyze the level of vulnerability to groundwater and surface water pollution in Ngestiharjo Village and to make management directives.

This study uses a qualitative and quantitative combination methods. Methods of collecting research data using field survey and mapping methods as well as laboratory tests with parameters BOD, COD, TDS, TSS, Ammonia, Sulfide, Nitrate and Fecal Coliform. The sampling technique used was purposive sampling. The analysis and evaluation of this study uses DRASTIC method to analyze groundwater vulnerability and PCSM method to analyze surface water vulnerability and the Pollution Index method to determine the water quality status. Descriptive analysis method is used in the evaluation and management directive in the research and continued with the design of communal constructed wetland WWTP.

*The results showed that the quality of the waste water quality test of the tofu industry and pig farms exceed the specified waste quality standards. The pollution index value of all underground water samples is lightly polluted and also river water is moderately polluted. The results of the groundwater vulnerability analysis resulted in one classification level, which is very high with a classification value of > 172 which is influenced by the number of parameters with similar values. Surface water vulnerability resulted two levels of vulnerability, namely vulnerable and moderately vulnerable with land use parameters being the most influential parameter. The management directives is in the form of a Communal Constructed Wetland WWTP design with a sub-surface flow system and using Cattail (*Typha angustifolia*) plants and a detention time of 1,54 days.*

Keywords: *Water vulnerabilities; Water Quality; DRASTIC*